

# Cellphone-Mate, Inc.

## TEST REPORT FOR

### 5 Band Mobile Consumer Booster Model: Fusion2Go 3.0

Tested to The Following Standard:

FCC Part 20.21 / 22H / 24E / 27

Report No.: 101623-12

Date of issue: September 7, 2018



Test Certificate # 803.06

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

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## ADMINISTRATIVE INFORMATION

### Test Report Information

**REPORT PREPARED FOR:**

Cellphone-Mate, Inc.  
48346 Milmont Drive  
Fremont, CA 94538

Representative: Dennis Findley  
Customer Reference Number: SC20180720D

**DATE OF EQUIPMENT RECEIPT:****DATE(S) OF TESTING:****REPORT PREPARED BY:**

Terri Rayle  
CKC Laboratories, Inc.  
5046 Sierra Pines Drive  
Mariposa, CA 95338

Project Number: 101623

August 6, 2018

August 6-24, 2018

### Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the equipment provided by the client, tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.

A handwritten signature in black ink, reading "Steve Behm", is positioned above a horizontal line.

**Steve Behm**  
**Director of Quality Assurance & Engineering Services**  
**CKC Laboratories, Inc.**

## Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):  
CKC Laboratories, Inc.  
1120 Fulton Place  
Fremont, CA 94539

## Software Versions

| CKC Laboratories Proprietary Software | Version |
|---------------------------------------|---------|
| EMITest Emissions                     | 5.03.11 |
| EMITest Immunity                      | 5.03.10 |

## Site Registration & Accreditation Information

| Location    | NIST CB # | TAIWAN         | CANADA  | FCC    | JAPAN  |
|-------------|-----------|----------------|---------|--------|--------|
| Fremont, CA | US0082    | SL2-IN-E-1148R | 3082B-1 | US1023 | A-0149 |

## SUMMARY OF RESULTS

Standard / Specification: FCC Part 20.21/22H/24E/27

Wideband Consumer Signal Booster Measurement Guidance: KDB #935210 DO3 v04r02, June 19, 2018

| Correlation Matrix & Results                    |                                                                  |                                                                      |                                             |      |         |
|-------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------|------|---------|
| Guidance Section                                | Guidance Description                                             | FCC Section                                                          | FCC Rule Description                        | Mods | Results |
| 7.1 a) - k)                                     | Authorized Frequency Band Verification Test                      | 20.21(e)(3)                                                          | Frequency Bands                             | NA   | Pass    |
| 7.2.2 a) - k)                                   | Maximum Power Measurement Procedure                              | 2.1046/20.21(e)(8)(i)(D)                                             | Power Limit                                 | NA   | Pass    |
| 7.3 a) - d)                                     | Maximum Booster Gain Computation                                 | 20.21(e)(8)(i)(B)                                                    | Bidirectional Capabilities                  | NA   | Pass    |
| 7.4 a) - n)                                     | Intermodulation Product                                          | 20.21(e)(8)(i)(F)                                                    | Intermodulation Limit                       | NA   | Pass    |
| 7.5 a) - n)                                     | Out of Band Emissions                                            | 20.21(e)(8)(i)(E)                                                    | Out of Band Emission                        | NA   | Pass    |
| 7.6 a) - e)                                     | Conducted Spurious Emission                                      | 2.1051/22H/24E/27                                                    | Spurious emission                           | NA   | Pass    |
| 7.7.1 a) - g)<br>7.7.1 h) - n)<br>7.7.2 a) - g) | Noise Limit Procedure<br>Variable Noise<br>Variable Noise Timing | 20.21(e)(8)(i)(A)(2)(i)<br>20.21(e)(8)(i)(A)(1)<br>20.21(e)(8)(i)(H) | Noise Limits<br><br>Transmit Power Off Mode | NA   | Pass    |
| 7.8 a) - l)                                     | Uplink inactivity                                                | 20.21(e)(8)(i)(I)                                                    | Uplink Inactivity                           | NA   | Pass    |

NA = Not Applicable

## Standard / Specification: FCC Part 20.21/22H/24E/27 - continued

| Correlation Matrix & Results                                                |                             |                               |                         |      |         |
|-----------------------------------------------------------------------------|-----------------------------|-------------------------------|-------------------------|------|---------|
| Guidance Section                                                            | Guidance Description        | FCC Section                   | FCC Rule Description    | Mods | Results |
| 7.9.1 a) - l)                                                               | Variable Booster Gain       | 20.21(e)(8)(i)(C) (1), (2)(i) | Booster Gain            | NA   | Pass    |
| 7.9.2 a) - f)                                                               | Variable Uplink Gain Timing | 20.21(e)(8)(i)(H)             | Transmit Power Off Mode |      |         |
| 7.10.a) - j)                                                                | Occupied Band Width         | 2.1049/22H/24E/27             | Occupied Band Width     | NA   | Pass    |
| 7.11.2 a) - r)<br>7.11.3 a) - h)<br>7.11.4 a) - h)<br>(alternate to 7.11.3) | Anti-Oscillation            | 20.21(e)(8)(ii)(A)            | Anti-Oscillation        | NA   | Pass    |
| 7.12a) - f)                                                                 | Radiated Spurious Emission  | 2.1053/ 22H/24E/27            | Spurious Emission       | NA   | Pass    |
| 7.13 a) - c)                                                                | Spectrum Block Filter       | NA                            | NA                      | NA   | NA1     |

NA = Not applicable

NA1 = Not applicable because the EUT does not employ spectrum block filter and also not dual-enclosure wideband consumer signal booster.

### ISO/IEC 17025 Decision Rule

The declaration of pass or fail herein is based upon assessment to the specification(s) listed above, including where applicable, assessment of measurement uncertainties. For performance related tests, equipment was monitored for specified criteria identified in that section of testing.

## Modifications During Testing

This list is a summary of the modifications made to the equipment during testing.

| Summary of Conditions                      |
|--------------------------------------------|
| No modifications were made during testing. |
|                                            |

Modifications listed above must be incorporated into all production units.

## Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

| Summary of Conditions |
|-----------------------|
| None                  |
|                       |

## EQUIPMENT UNDER TEST (EUT)

During testing, numerous configurations may have been utilized. The configurations listed below support compliance to the standard(s) listed in the Summary of Results section.

### Configuration 1

#### Equipment Tested:

| Device                         | Manufacturer         | Model #       | S/N |
|--------------------------------|----------------------|---------------|-----|
| 5 Band Mobile Consumer Booster | Cellphone-Mate, Inc. | Fusion2Go 3.0 | 3   |

#### Support Equipment:

| Device       | Manufacturer | Model #          | S/N |
|--------------|--------------|------------------|-----|
| Power Supply | Surecall     | GME36A-120300FDS | NA  |

### General Product Information:

| Product Information        | Manufacturer-Provided Details                                                                                                                                            |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Equipment Type:            | Stand-Alone Equipment                                                                                                                                                    |
| Type of Equipment          | Wideband Consumer booster/Zone Enhancer                                                                                                                                  |
| Operating Frequency Range: | UL: 824-849MHz<br>DL: 869-894MHz<br><br>UL: 1850-1915MHz<br>DL: 1930-1995MHz<br><br>UL: 1710-1755MHz, 698-716MHz, 776-787MHz<br>DL: 2110-2155MHz, 728-746MHz, 746-757MHz |
| OBW and Emissions Type(s): | GXW (GSM)<br>G7W (EDGE)<br>F9W(CDMA)<br>F9W(WCDMA)<br>W7D (LTE))                                                                                                         |
| Modulation Type(s):        | 0.3 GMSK (GSM)<br>3p/8 8-PSK (EDGE)<br>QPSK (CDMA)<br>BPSK/QPSK (WCDMA)<br>OFDM (LTE)                                                                                    |
| Number of TX Chains:       | 1                                                                                                                                                                        |
| Antenna Type(s) and Gain:  | Dedicated, See antenna kitting information                                                                                                                               |
| Beamforming Type:          | NA                                                                                                                                                                       |
| Antenna Connection Type:   | Donor/Outdoor antenna/ UL: 50-ohm FME<br>Server / indoor antenna/ DL: 50-ohm FME                                                                                         |
| Nominal Input Voltage:     | 12VDC                                                                                                                                                                    |
| Firmware used for Test:    | Fusion2GO V3.2.01-FC                                                                                                                                                     |

## FCC PART 20.21/22H/24E/27

### General Test Setup

#### Summary of Conditions

The equipment under test (EUT) is a Mobile Wideband Consumer Booster intended for automotive.

The EUT is placed on the Styrofoam platform for radiated emissions and a test bench for conducted emissions measurements.

UL: 824-849MHz

DL: 869-894MHz

UL: 1850-1915MHz

DL: 1930-1995MHz

UL: 1710-1755MHz, 698-716MHz, 776-787MHz

DL: 2110-2155MHz, 728-746MHz, 746-757MHz

Test procedure:

The test was performed in accordance with the FCC document: 935210 D03 Signal Booster Measurements v04r02, dated June 19, 2018.

Firmware: Fusion2GO V3.2.01-FC

Device is powered by a support 12V DC power supply

## 7.1 Authorized Frequency Band Verification

### Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170  
 Customer: Cellphone-Mate, Inc.  
 Specification: **7.1 Authorized Frequency Band Verification**  
 Work Order #: **101623** Date 08/06/18  
 Test Type: **Conducted Emissions**  
 Tested By: **Hieu Song Nguyenpham**  
 Software: EMITest 5.03.11

#### Equipment Tested:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

#### Support Equipment:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

#### Test Conditions / Notes:

Test environment conditions:  
 Temperature: 23.6°C  
 Relative Humidity: 44%  
 Pressure: 102.5 kPa

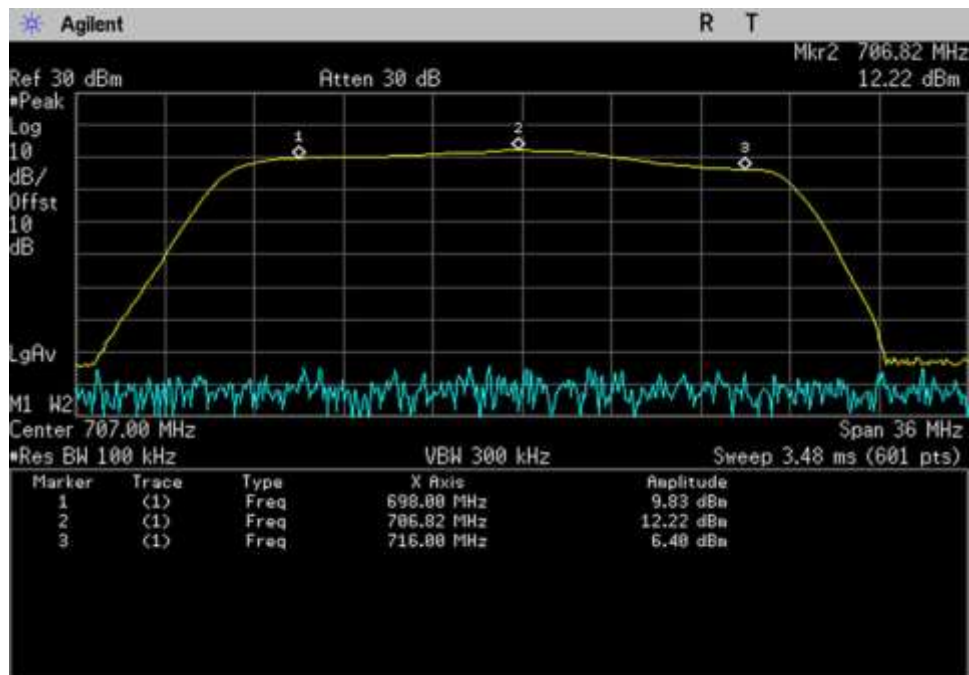
#### Test Equipment:

| Asset # | Description       | Manufacturer | Model                    | Calibration Date | Cal Due Date |
|---------|-------------------|--------------|--------------------------|------------------|--------------|
| P05411  | Attenuator        | Weinschel    | 54A-10                   | 1/19/2018        | 1/19/2020    |
| P07192  | Cable             | Astro        | 32022-29094K-29094K-48TC | 10/9/2017        | 10/9/2019    |
| P07191  | Cable             | Astro        | 32022-29094K-29094K-48TC | 10/30/2017       | 10/30/2019   |
| 03418   | Signal Generator  | Agilent      | E4438C                   | 6/19/2017        | 6/19/2019    |
| 03470   | Spectrum Analyzer | Agilent      | E4440A                   | 1/3/2018         | 1/3/2020     |

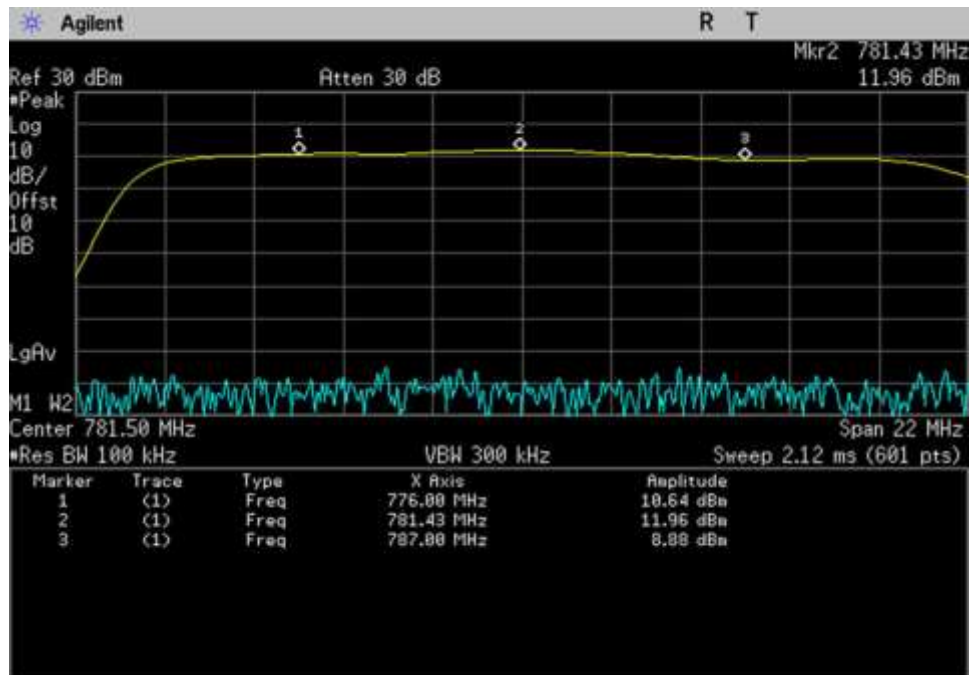
## Summary of Results

Pass: The plots below show the device only operates on the CMRS frequency bands authorized for use by the NPS.

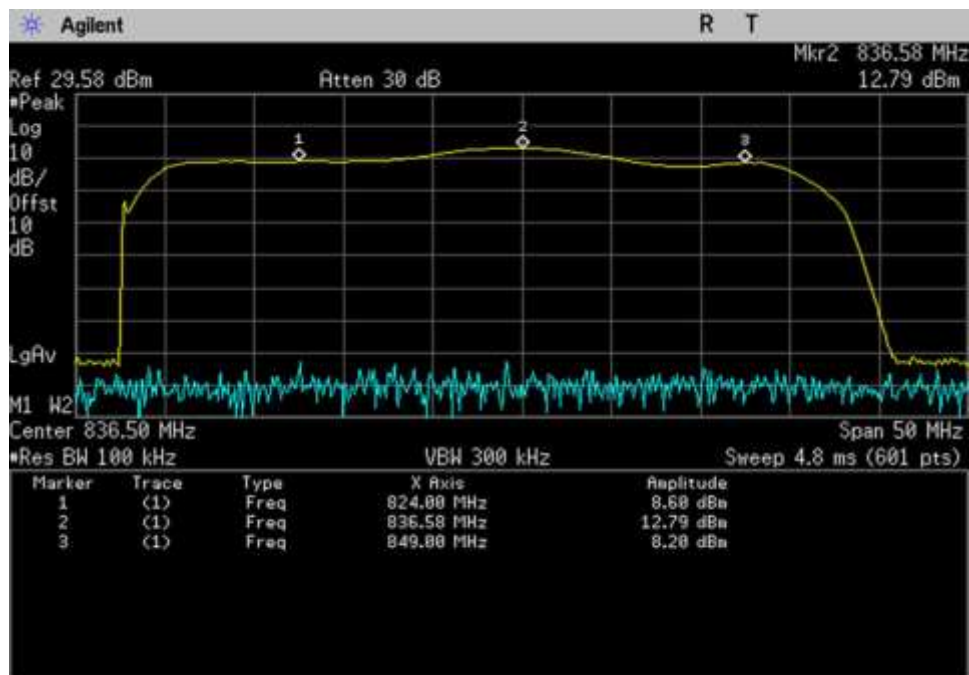
## Plots



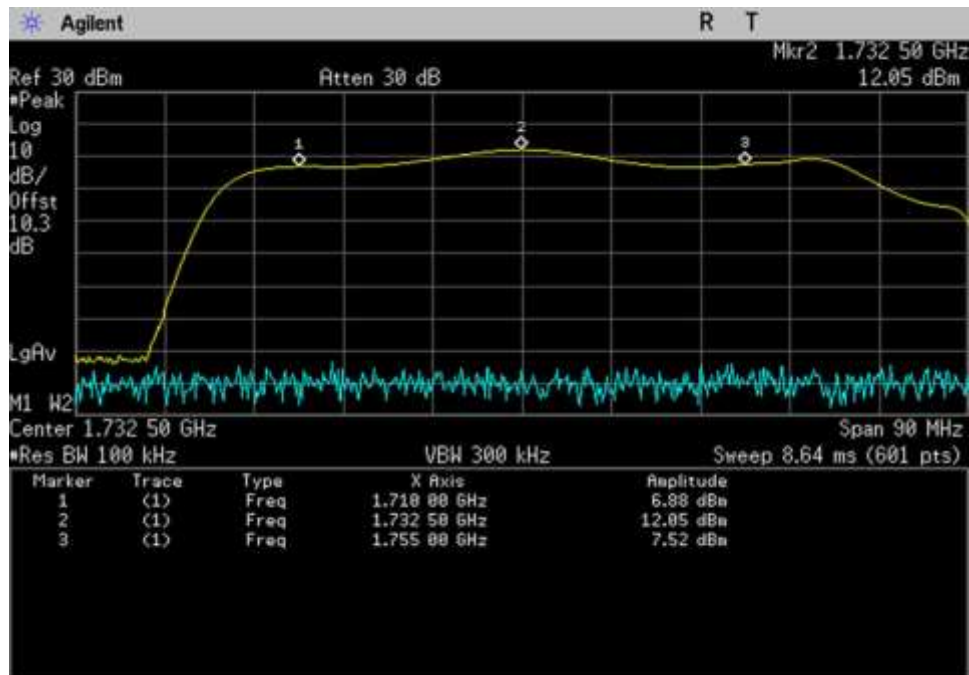
UL\_698-716\_ 698- 706.82MHz



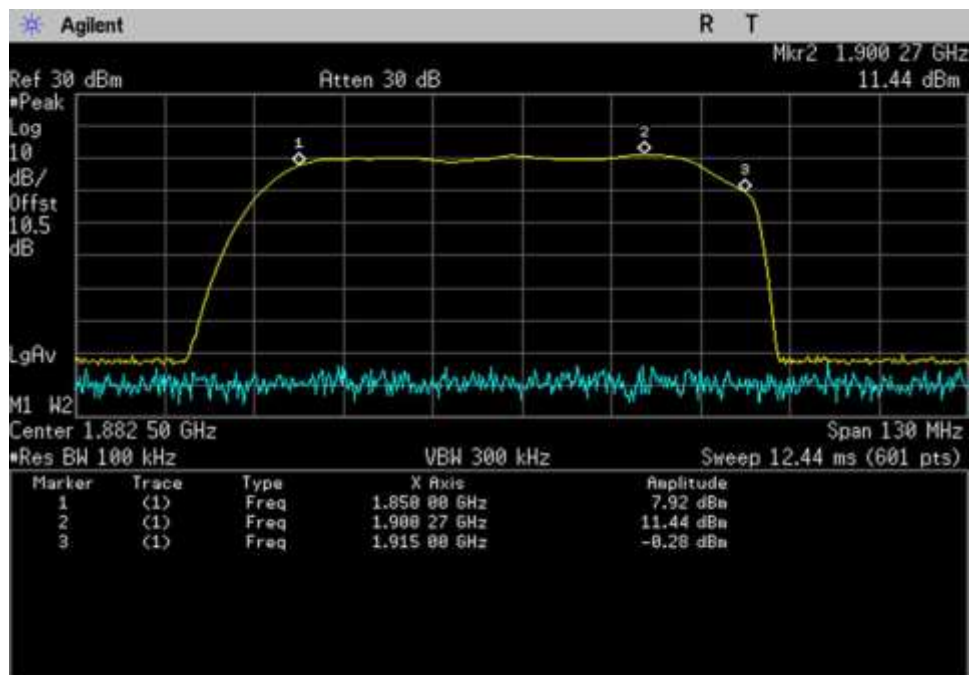
UL\_776-787\_ 776- 781.43MHz



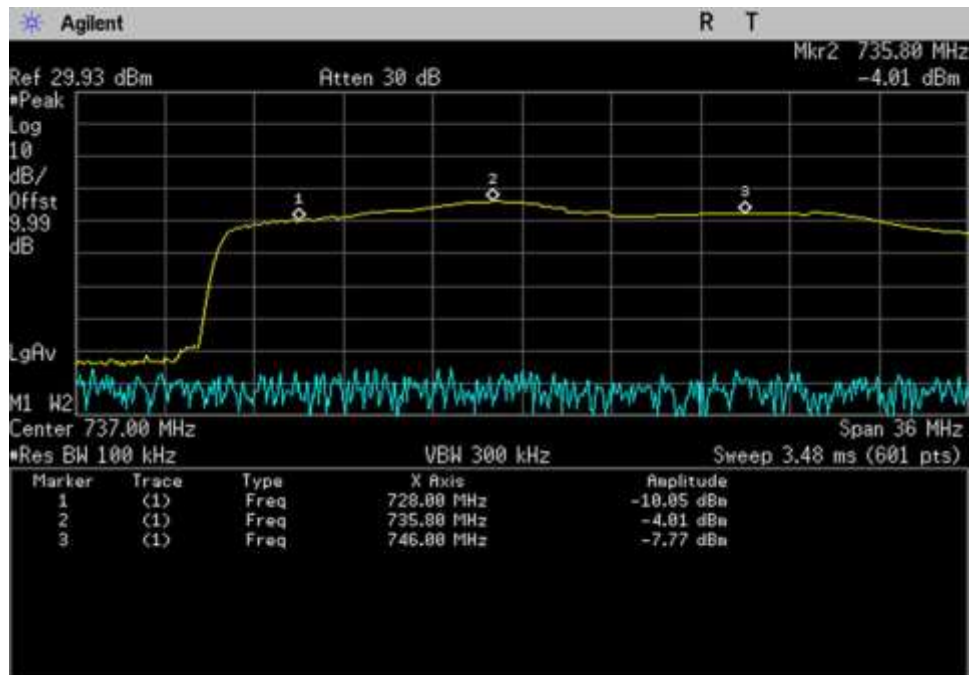
UL\_824-849\_ 824- 836.58MHz



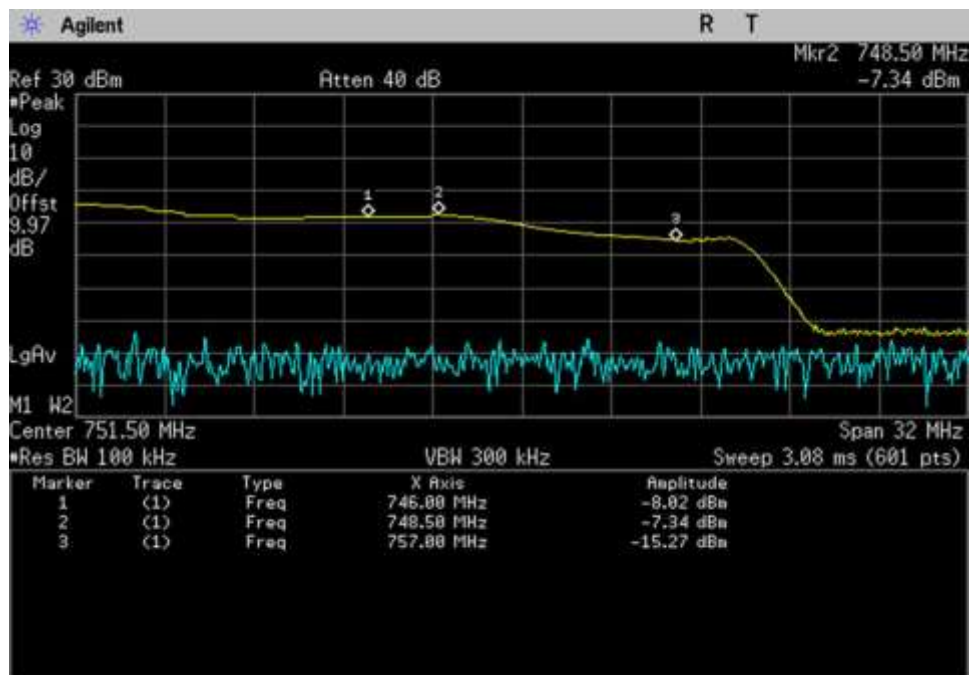
UL\_1710-1755\_ 1710- 1732.5MHz



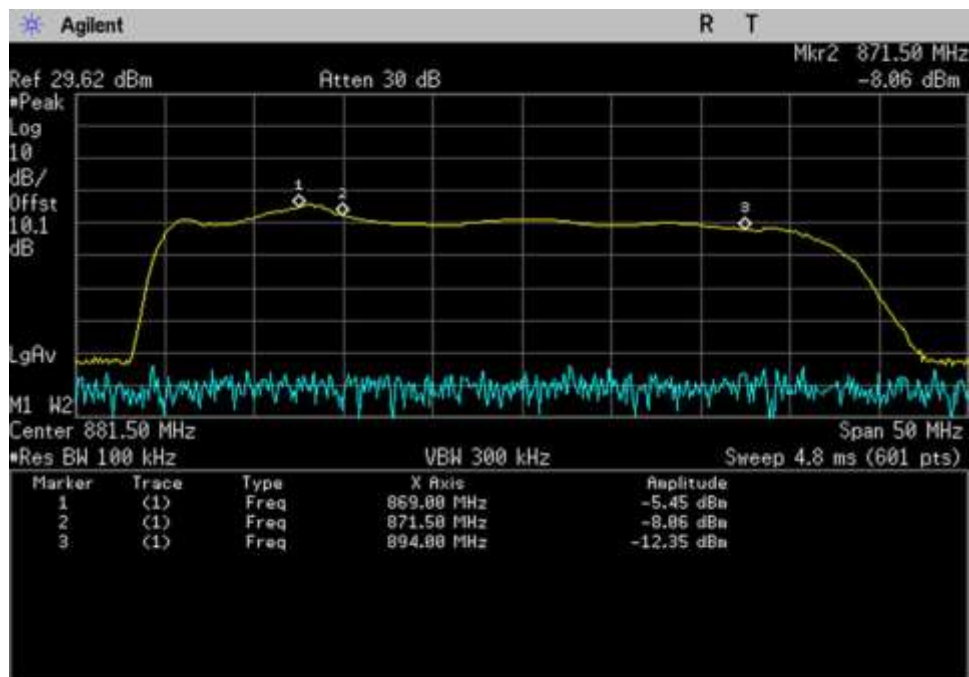
UL\_1850-1915\_ 1850- 1900.27MHz



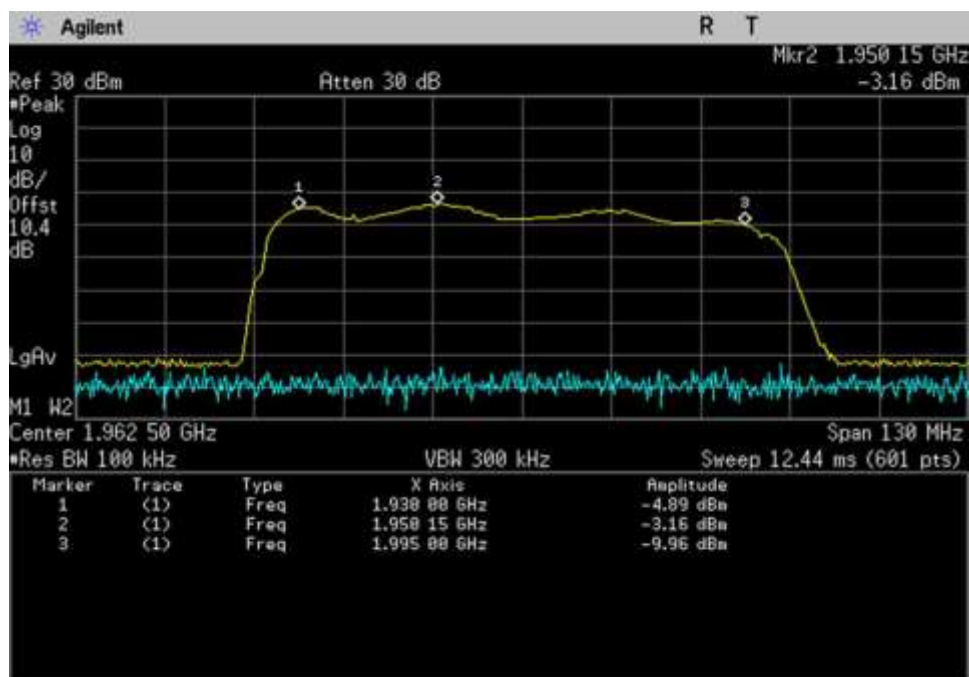
DL\_728-746\_ 728- 735.8MHz



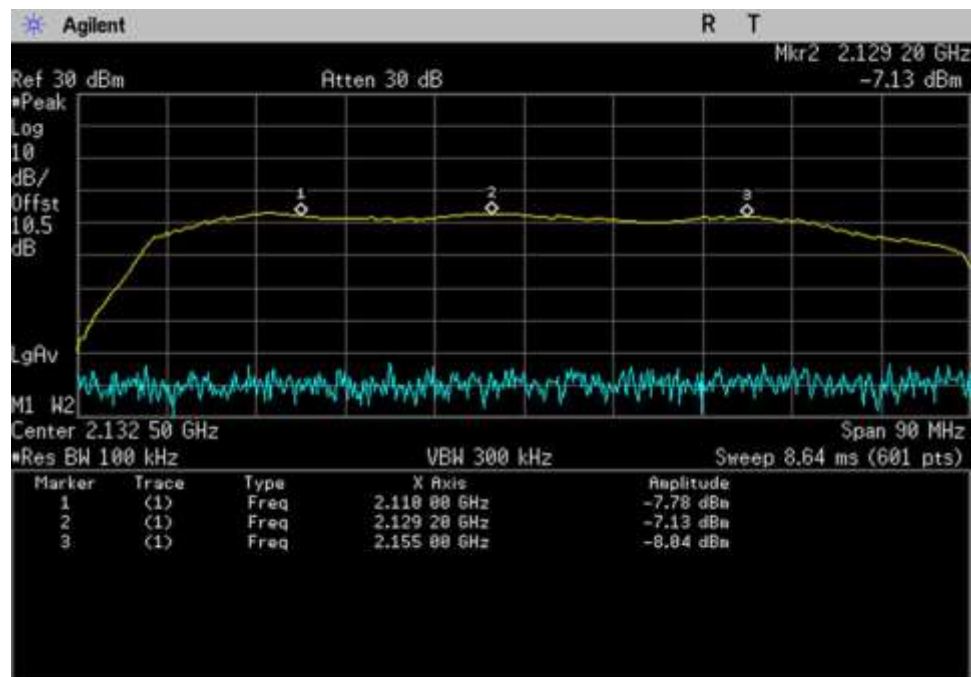
DL\_746-757\_ 746- 748.5MHz



DL\_869-894\_ 869- 871.5MHz



DL\_1930-1995\_ 1930- 1950.15MHz



DL\_2110-2155\_ 2110- 2129.2MHz

## 7.2 Maximum Power / 7.3 Maximum Gain

### Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170  
 Customer: Cellphone-Mate, Inc.  
 Specification: **7.2 Maximum Power Measurement**  
**7.3 Maximum Booster Gain**  
 Work Order #: **101623** Date 08/06/18  
 Test Type: **Conducted Emissions**  
 Tested By: **Hieu Song Nguyenpham**  
 Software: **EMITest 5.03.11**

#### Equipment Tested:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

#### Support Equipment:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

#### Test Conditions / Notes:

Test environment conditions:  
 Temperature: 23.6°C  
 Relative Humidity: 44%  
 Pressure: 102.5 kPa

#### Test Equipment:

| Asset # | Description       | Manufacturer | Model                    | Calibration Date | Cal Due Date |
|---------|-------------------|--------------|--------------------------|------------------|--------------|
| P05411  | Attenuator        | Weinschel    | 54A-10                   | 1/19/2018        | 1/19/2020    |
| P07192  | Cable             | Astro        | 32022-29094K-29094K-48TC | 10/9/2017        | 10/9/2019    |
| P07191  | Cable             | Astro        | 32022-29094K-29094K-48TC | 10/30/2017       | 10/30/2019   |
| 03418   | Signal Generator  | Agilent      | E4438C                   | 6/19/2017        | 6/19/2019    |
| 03470   | Spectrum Analyzer | Agilent      | E4440A                   | 1/3/2018         | 1/3/2020     |

## Summary of Results

Pass: As summarized in table below, measured EIRP, Gain and UL/DL gain ratio are within limits.

| Pre AGC         |             |              |           | Pre AGC      |              |           |
|-----------------|-------------|--------------|-----------|--------------|--------------|-----------|
| Pulse GSM       |             |              |           | 4.1 MHz AWGN |              |           |
| Frequency (MHz) | Input (dBm) | Output (dBm) | Gain (dB) | Input (dBm)  | Output (dBm) | Gain (dB) |
| UL1710-1755     | -27.2       | 20.0         | 47.2      | -25.3        | 20.7         | 46.0      |
| UL1850-1915     | -25.6       | 20.9         | 46.5      | -25.9        | 19.6         | 45.5      |
| UL824-894       | -25.3       | 22.3         | 47.6      | -21.7        | 25.6         | 47.3      |
| UL 698-716      | -24.1       | 23.0         | 47.1      | -20.1        | 26.6         | 46.7      |
| UL776-787       | -21.3       | 25.6         | 46.9      | -20.5        | 25.9         | 46.4      |
|                 |             |              |           |              |              |           |
| DL2110-2155     | -48.5       | -3.7         | 44.8      | -49.4        | -4.5         | 44.9      |
| DL1930-1995     | -45.7       | 1.0          | 46.7      | -46.7        | 0.2          | 46.9      |
| DL869-894       | -51.1       | -5.5         | 45.6      | -51.6        | -5.8         | 45.8      |
| DL:728-746      | -48.0       | -0.3         | 47.7      | -48.4        | -1.8         | 46.6      |
| DL 746-757      | -49.4       | -2.8         | 46.6      | -50.9        | -4.3         | 46.6      |

| Pulse GSM       |                    |                 |                 |            | Conducted       | Conducted and EIRP |
|-----------------|--------------------|-----------------|-----------------|------------|-----------------|--------------------|
| Frequency (MHz) | Output Power (dBm) | *Ant Gain (dBi) | Cable loss (dB) | EIRP (dBm) | Limit Min (dBm) | Limit Max (dBm)    |
| UL1710-1755     | 20.0               | 4.0             | 6.1             | 17.9       | 17              | 30                 |
| UL1850-1915     | 20.9               | 4.0             | 6.5             | 18.4       | 17              | 30                 |
| UL824-894       | 22.3               | 3.0             | 4.0             | 21.3       | 17              | 30                 |
| UL 698-716      | 23.0               | 3.0             | 3.5             | 22.5       | 17              | 30                 |
| UL776-787       | 25.6               | 3.0             | 3.5             | 25.1       | 17              | 30                 |
|                 |                    |                 |                 |            |                 |                    |
| DL2110-2155     | -3.7               | 10.0            | 3.8             | 2.5        | NA              | 17                 |
| DL1930-1995     | 1.0                | 10.0            | 3.6             | 7.4        | NA              | 17                 |
| DL869-894       | -5.5               | 7.0             | 2.3             | -0.8       | NA              | 17                 |
| DL:728-746      | -0.3               | 7.0             | 2.1             | 4.6        | NA              | 17                 |
| DL 746-757      | -2.8               | 7.0             | 2.1             | 2.1        | NA              | 17                 |

| 4.1MHz AWGN     |                    |                 |                 |            | Conducted       | Conducted and EIRP |
|-----------------|--------------------|-----------------|-----------------|------------|-----------------|--------------------|
| Frequency (MHz) | Output Power (dBm) | *Ant Gain (dBi) | Cable loss (dB) | EIRP (dBm) | Limit Min (dBm) | Limit Max (dBm)    |
| UL1710-1755     | 20.7               | 4.0             | 6.1             | 18.6       | 17              | 30                 |
| UL1850-1915     | 19.6               | 4.0             | 6.5             | 17.1       | 17              | 30                 |
| UL824-894       | 25.6               | 3.0             | 4.0             | 24.6       | 17              | 30                 |
| UL 698-716      | 26.6               | 3.0             | 3.5             | 26.1       | 17              | 30                 |
| UL776-787       | 25.9               | 3.0             | 3.5             | 25.4       | 17              | 30                 |
|                 |                    |                 |                 |            |                 |                    |
| DL2110-2155     | -4.5               | 10.0            | 3.8             | 1.7        | NA              | 17                 |
| DL1930-1995     | 0.2                | 10.0            | 3.6             | 6.7        | NA              | 17                 |
| DL869-894       | -5.8               | 7.0             | 2.3             | -1.1       | NA              | 17                 |
| DL:728-746      | -1.8               | 7.0             | 2.1             | 3.1        | NA              | 17                 |
| DL 746-757      | -4.3               | 7.0             | 2.1             | 0.6        | NA              | 17                 |

\* Antenna gain and cable losses indicated from Fusion2go 3.2.0 Marine-1 Kit

UL SC288Wor Galaxy 5412-P and SC240-40FN

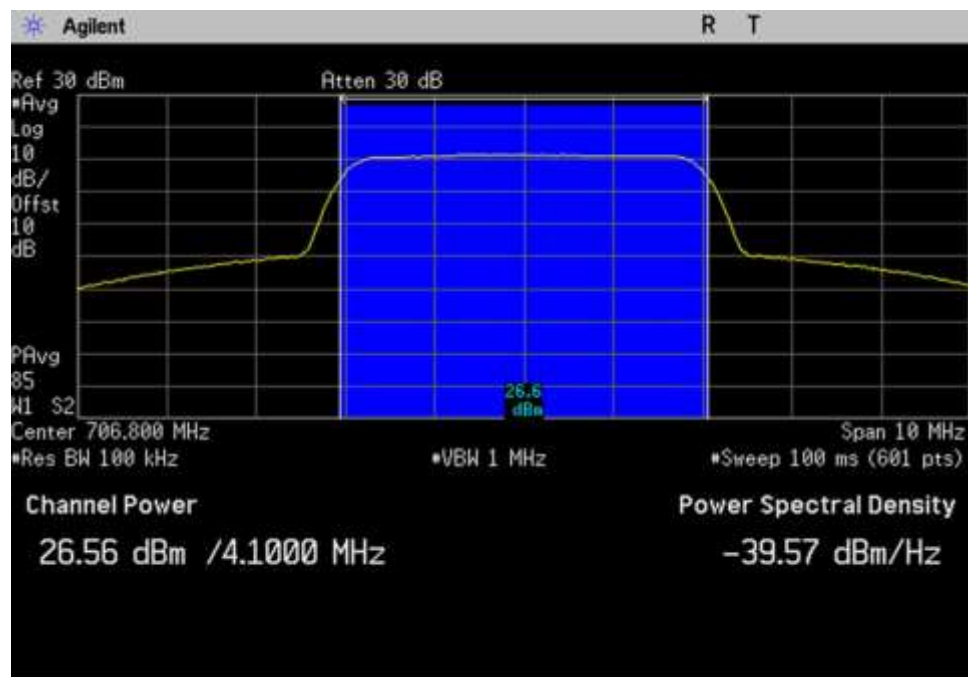
DL SC248W and SC240-20FN

| Section 5.5 power |             |              |           |              |              |           |
|-------------------|-------------|--------------|-----------|--------------|--------------|-----------|
| Frequency (MHz)   | Pulse GSM   |              |           | 4.1 MHz AWGN |              |           |
|                   | Input (dBm) | Output (dBm) | Gain (dB) | Input (dBm)  | Output (dBm) | Gain (dB) |
| UL1710-1755       | 10.0        | 20.1         | 10.1      | 10.0         | 19.7         | 9.7       |
| UL1850-1915       | 10.0        | 20.3         | 10.3      | 10.0         | 19.1         | 9.1       |
| UL824-894         | 10.0        | 21.9         | 11.9      | 10.0         | 25.6         | 15.6      |
| UL 698-716        | 10.0        | 22.2         | 12.2      | 10.0         | 26.4         | 16.4      |
| UL776-787         | 10.0        | 25.2         | 15.2      | 10.0         | 25.8         | 15.8      |
|                   |             |              |           |              |              |           |
| DL2110-2155       | -20.0       | -3.6         | 16.4      | -20.0        | -4.5         | 15.5      |
| DL1930-1995       | -20.0       | 0.3          | 20.3      | -20.0        | -0.7         | 19.4      |
| DL869-894         | -20.0       | -5.7         | 14.3      | -20.0        | -6.4         | 13.6      |
| DL:728-746        | -20.0       | -0.3         | 19.7      | -20.0        | -2.3         | 17.7      |
| DL 746-757        | -20.0       | -2.8         | 17.2      | -20.0        | -4.9         | 15.1      |

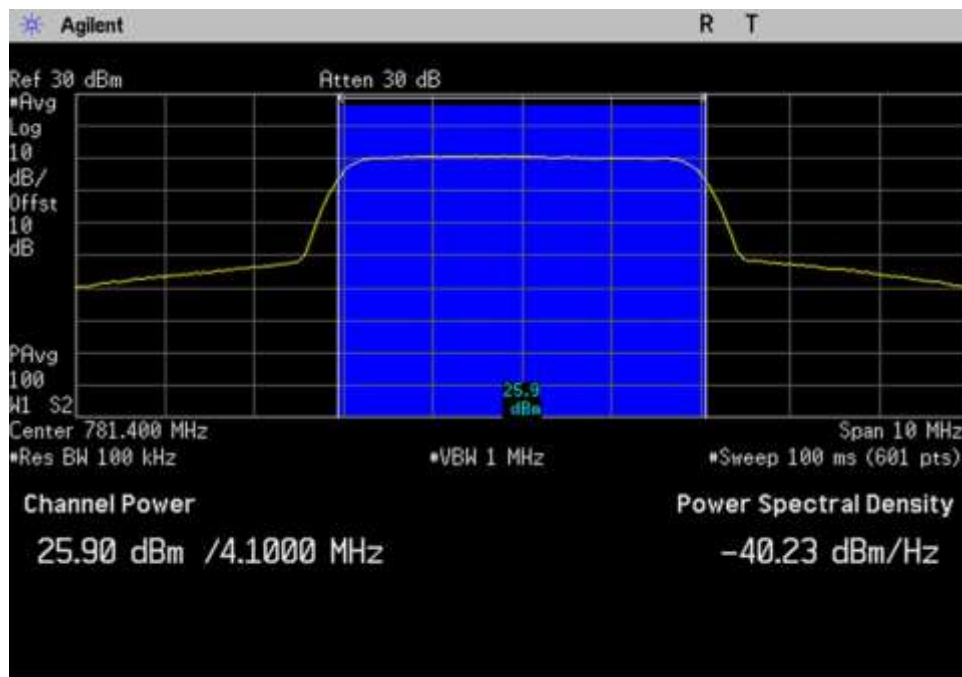
| UL gain vs DL gain           | Pulse GSM (dB) | 4.1MHz AWGN (dB) | Limit (dB) |
|------------------------------|----------------|------------------|------------|
| UL gain vs DL gain 1710/2110 | 2.4            | 1.1              | 9.0        |
| UL gain vs DL gain 1850/1930 | -0.2           | -1.4             | 9.0        |
| UL gain vs DL gain 824/869   | 2.0            | 1.5              | 9.0        |
| UL gain vs DL gain 776/728   | -0.6           | 0.1              | 9.0        |
| UL gain vs DL gain 776/746   | 0.3            | -0.2             | 9.0        |

## Plots

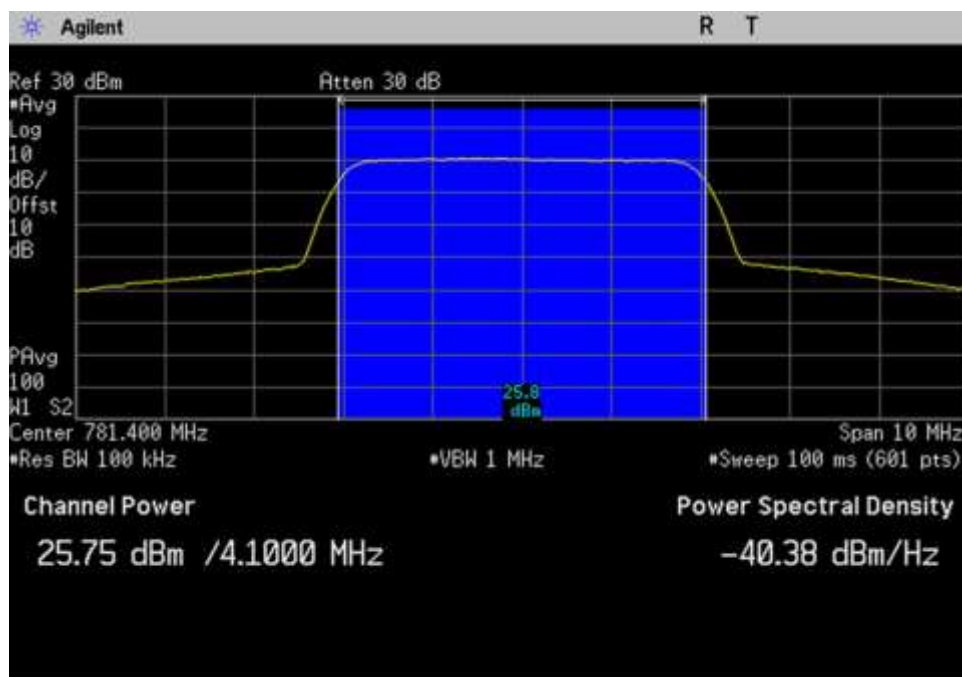
### AWGN



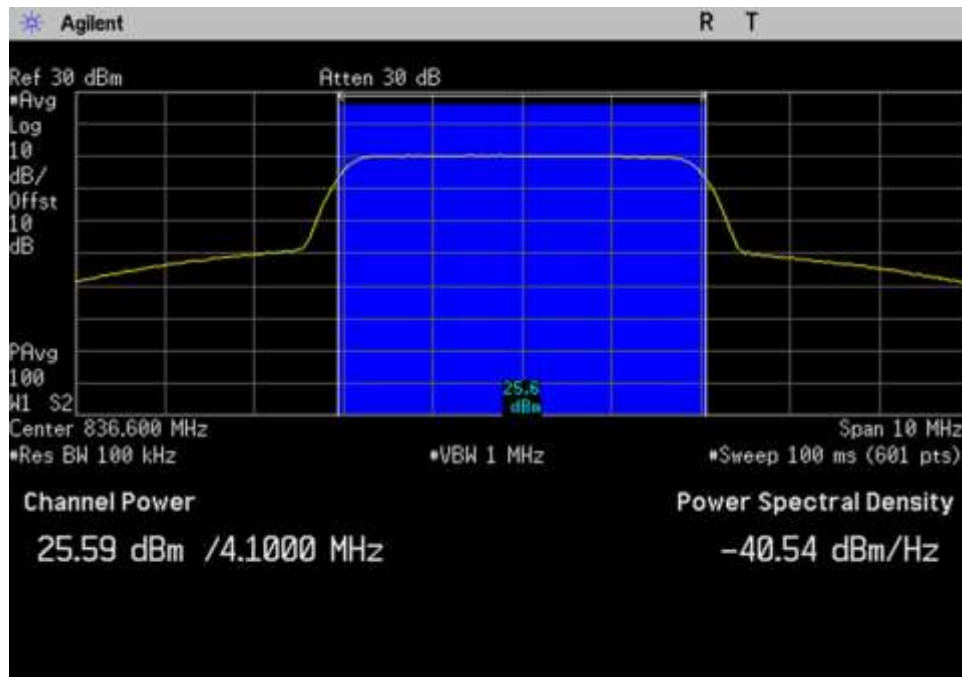
UL\_698-716\_AWGN\_ 706.8MHz



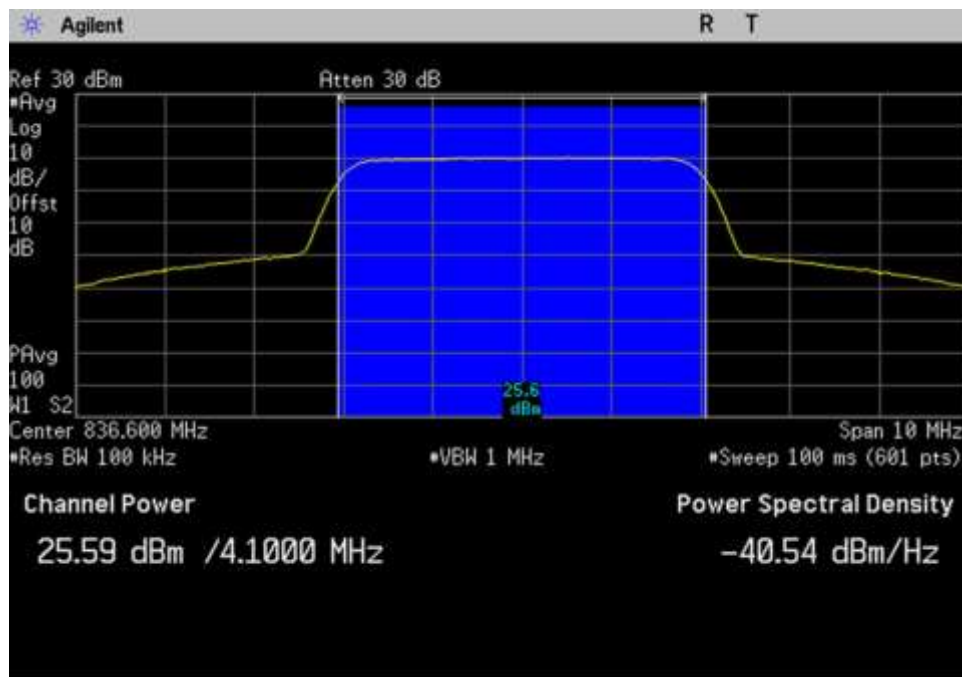
UL\_698-716\_AWGN\_Max\_706.8MHz



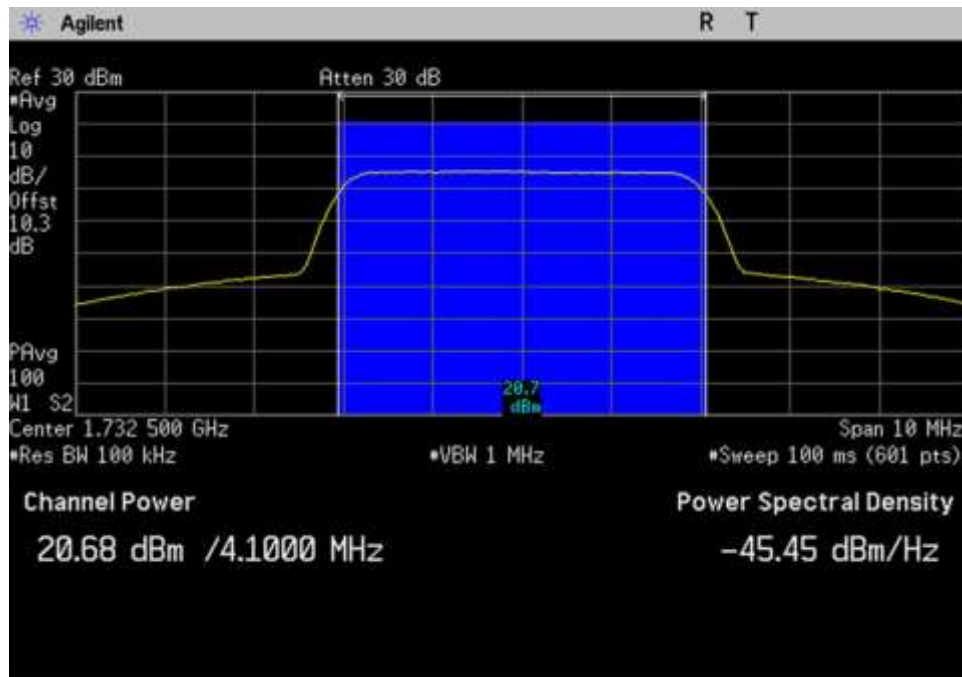
UL\_776-787\_AWGN\_781.4MHz



UL\_776-787\_AWGN\_Max\_781.4MHz



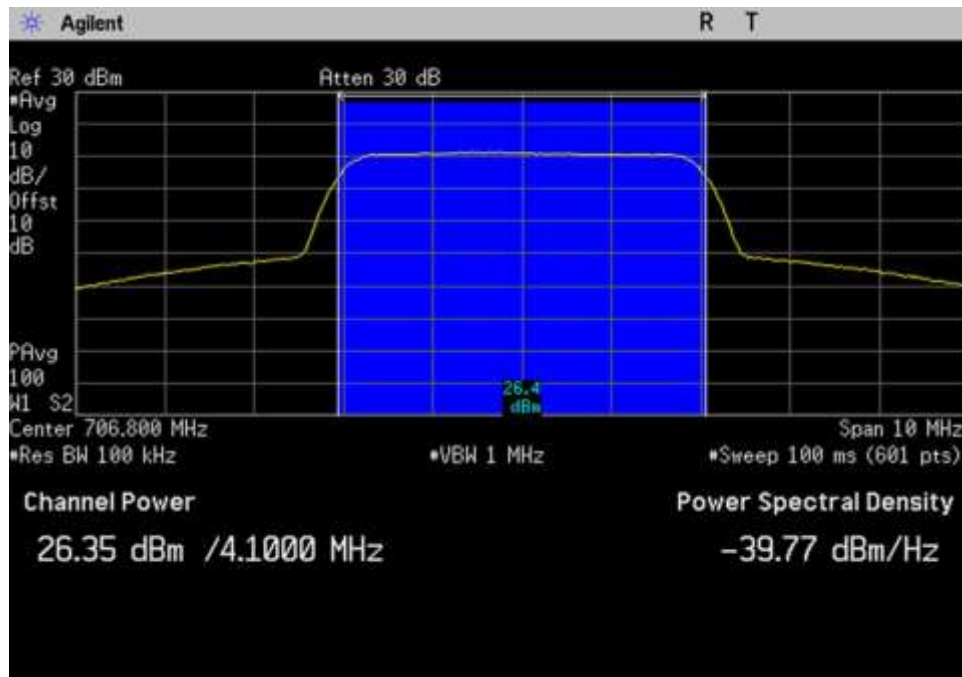
UL\_824-849\_AWGN\_836.6MHz



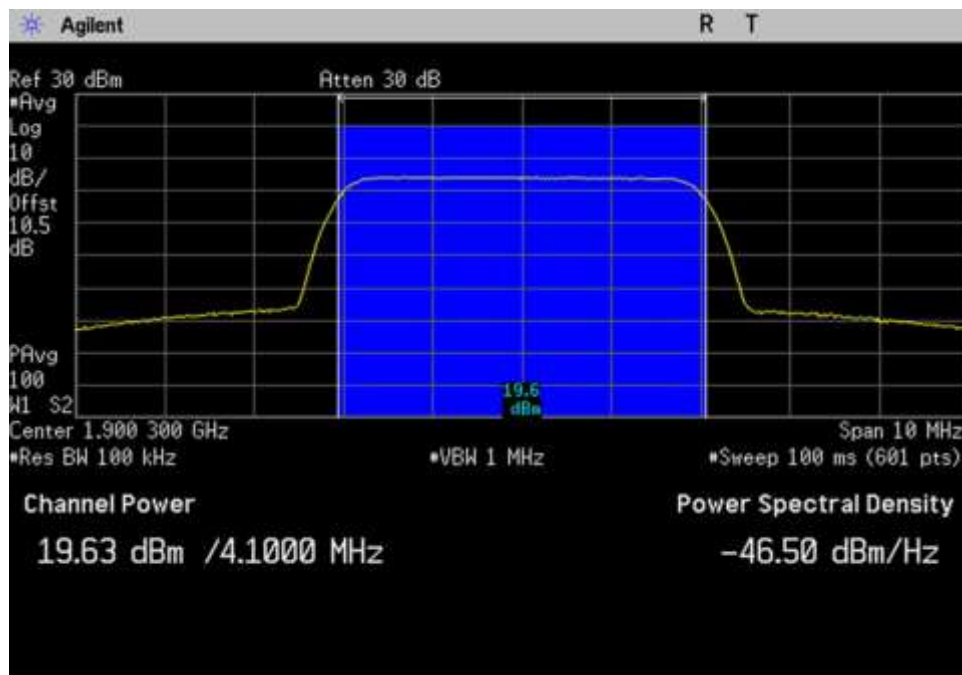
UL\_824-849\_AWGN\_Max\_ 836.6MHz



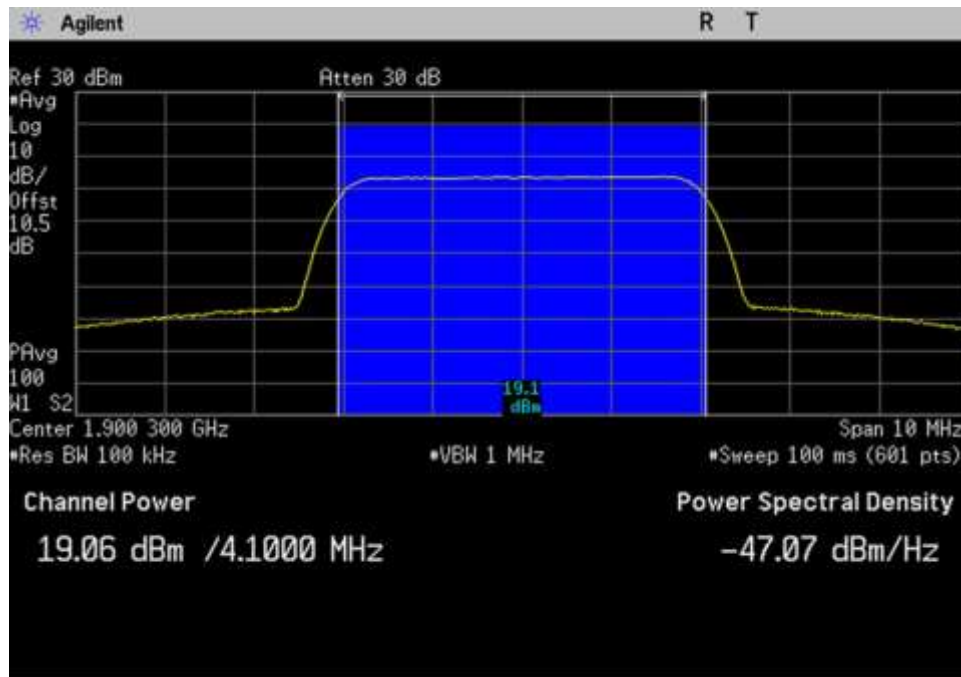
UL\_1710-1755\_AWGN\_ 1732.5MHz



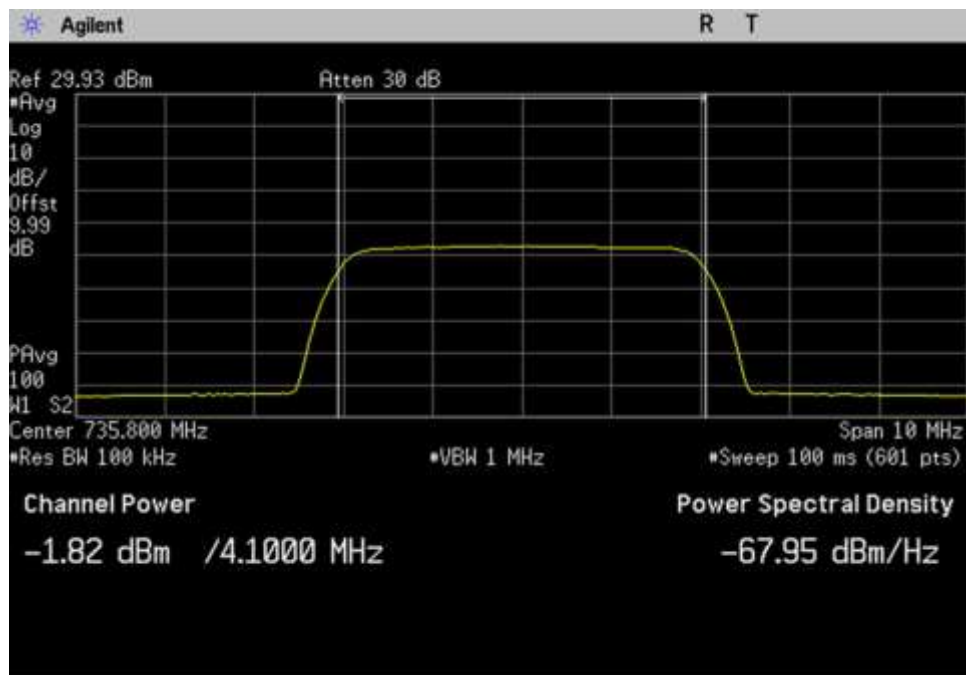
UL\_1710-1755\_AWGN\_Max\_1732.5MHz



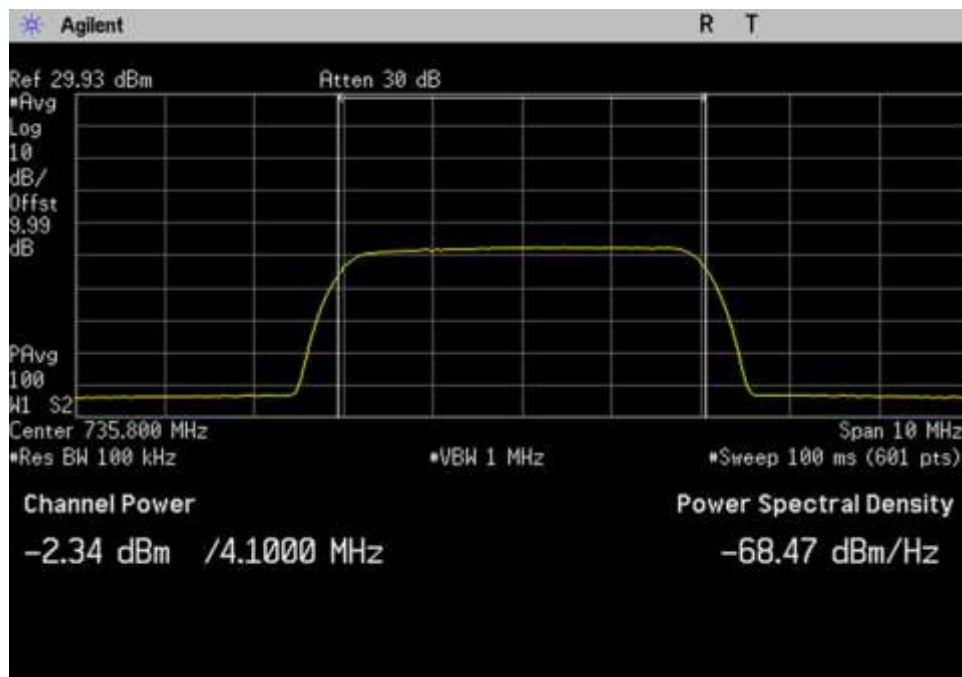
UL\_1850-1915\_AWGN\_1900.3MHz



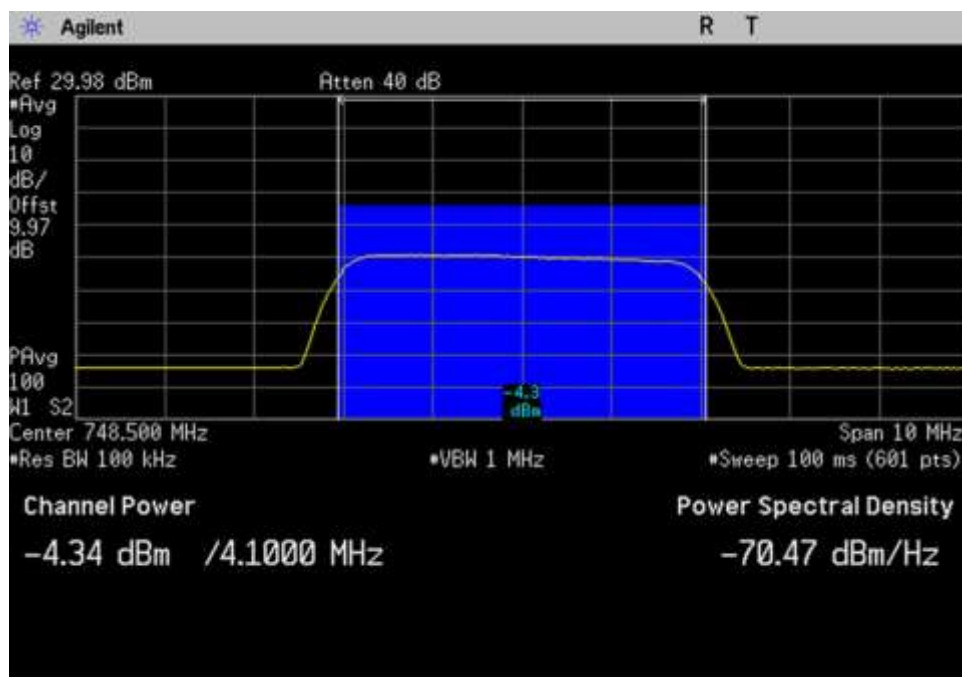
UL\_1850-1915\_AWGN\_Max\_ 1900.3MHz



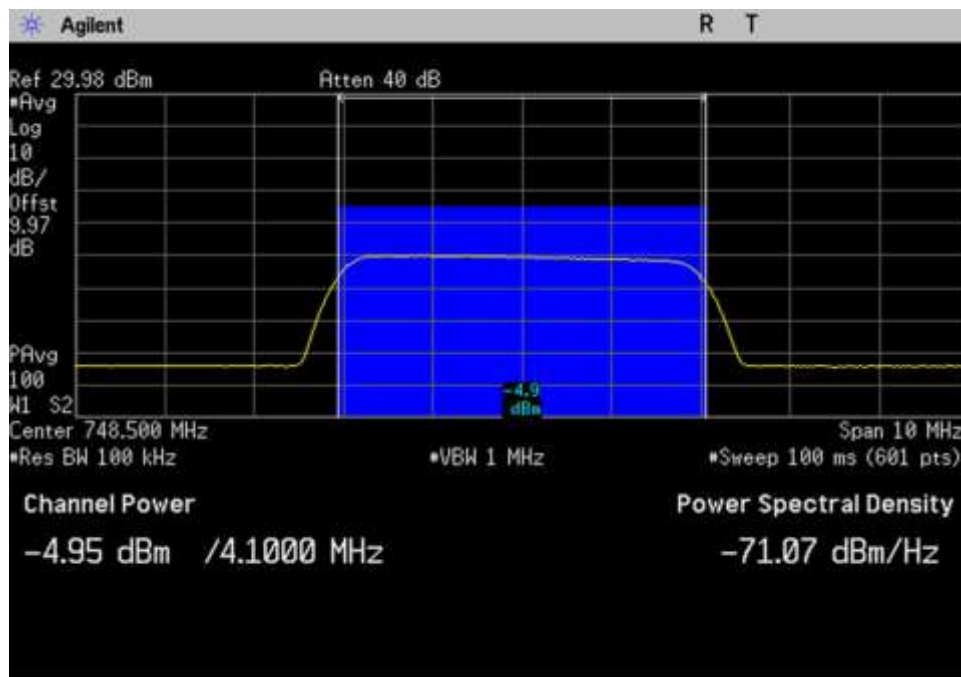
DL\_728-746\_AWGN\_ 735.8MHz



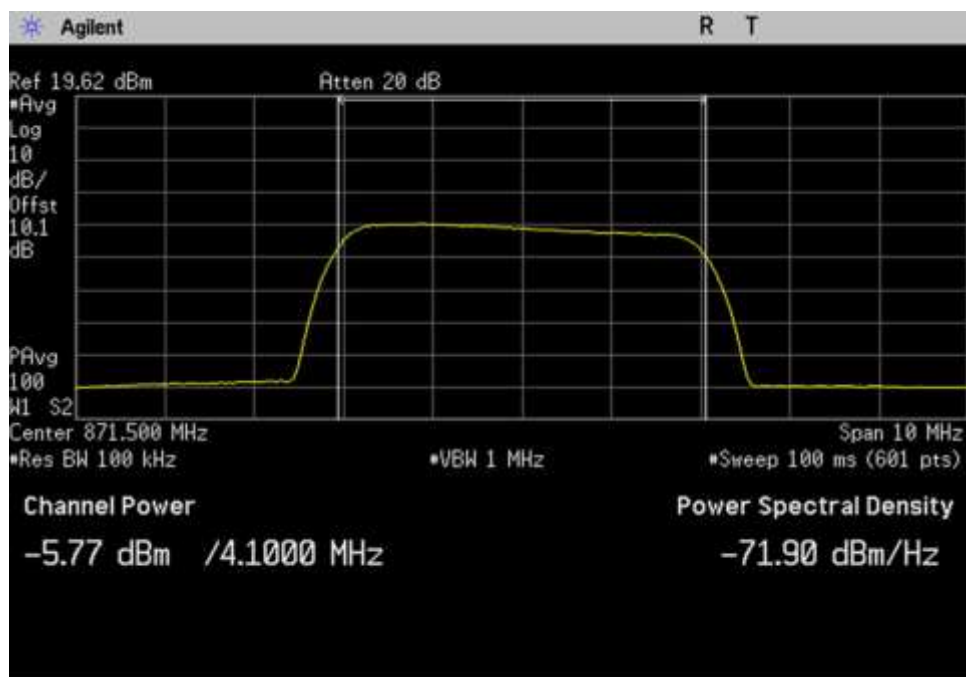
DL\_728-746\_AWGN\_Max\_735.8MHz



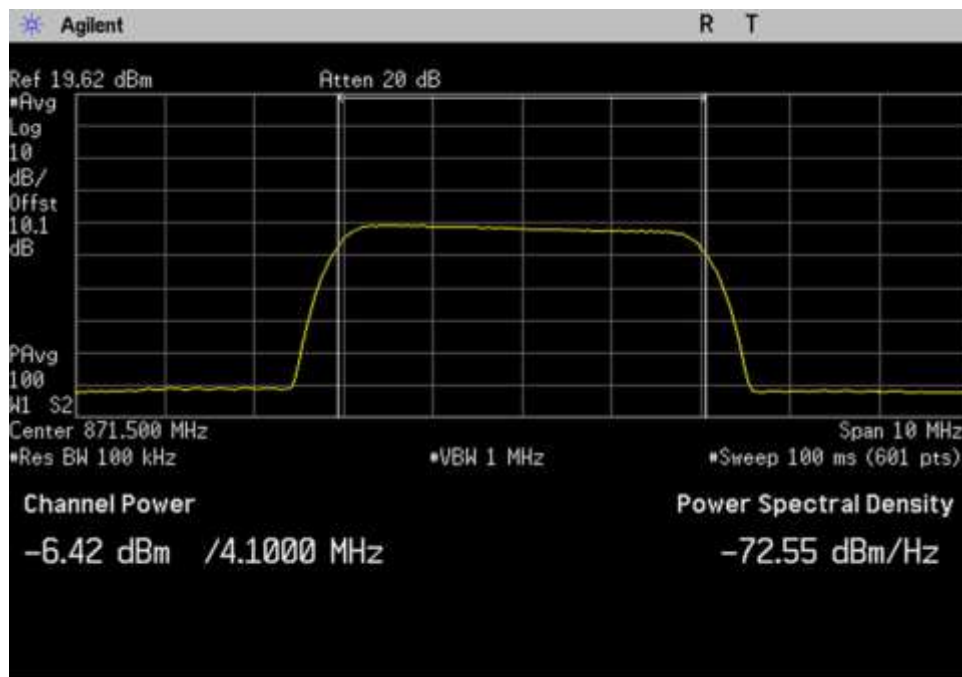
DL\_746-757\_AWGN\_748.5MHz



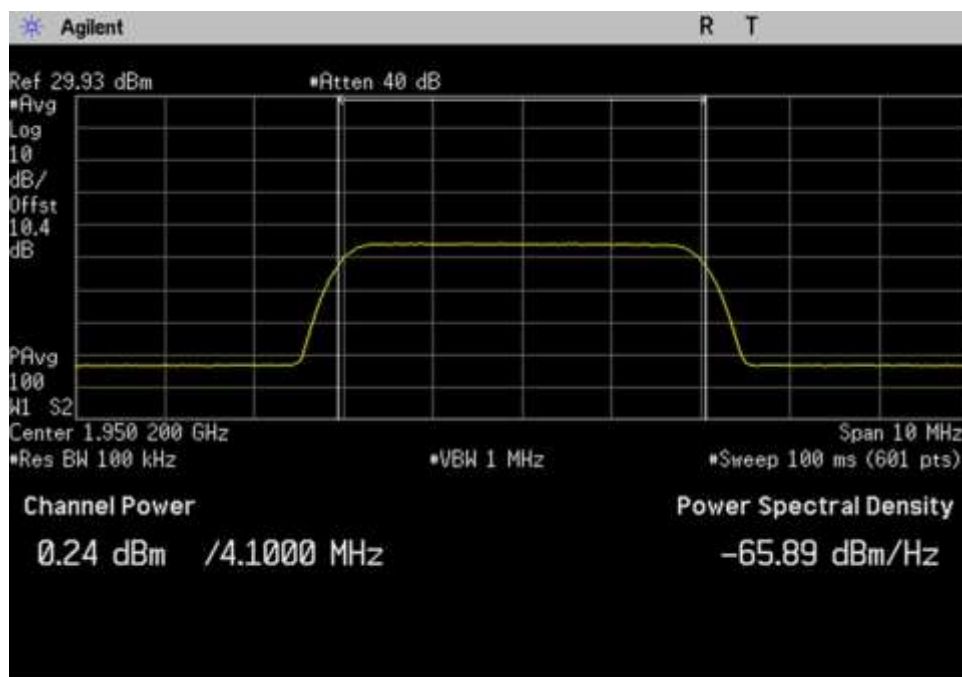
DL\_746-757\_AWGN\_Max\_748.5MHz



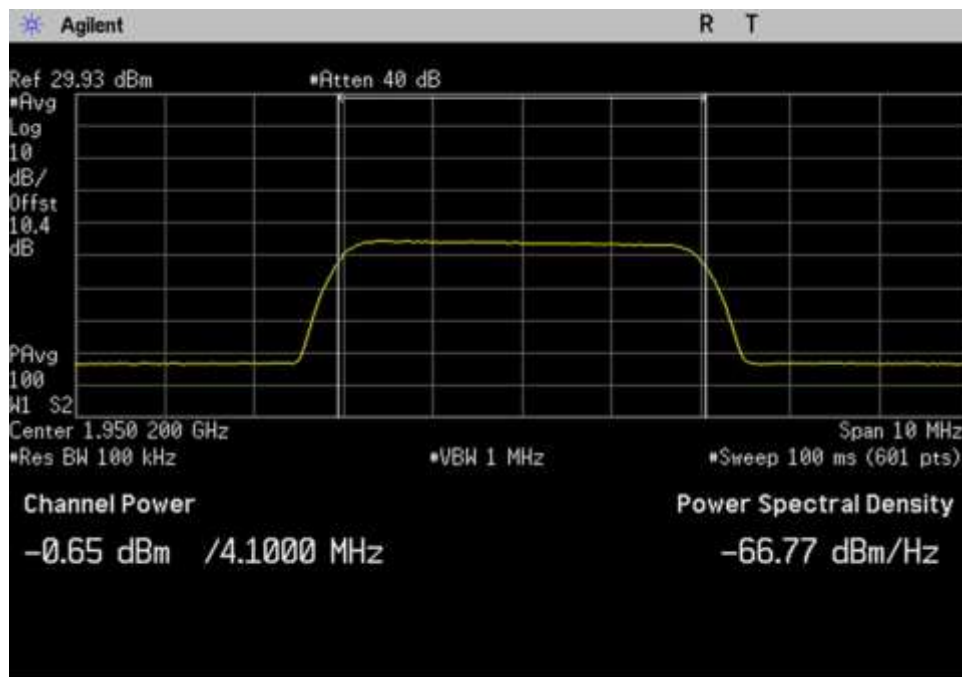
DL\_869-894\_AWGN\_871.5MHz



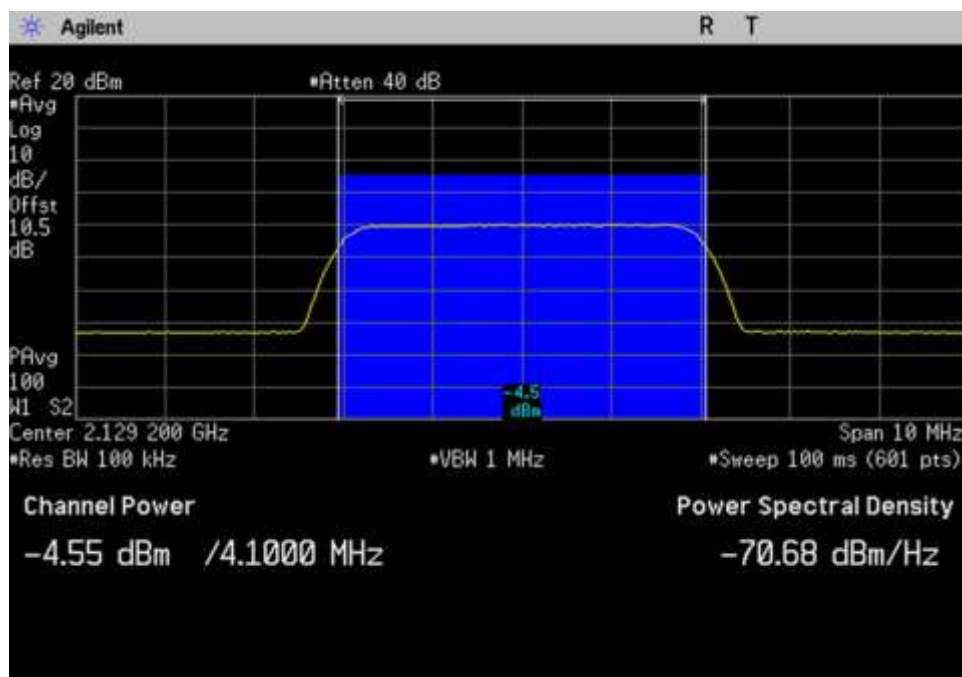
DL\_869-894\_AWGN\_Max\_ 871.5MHz



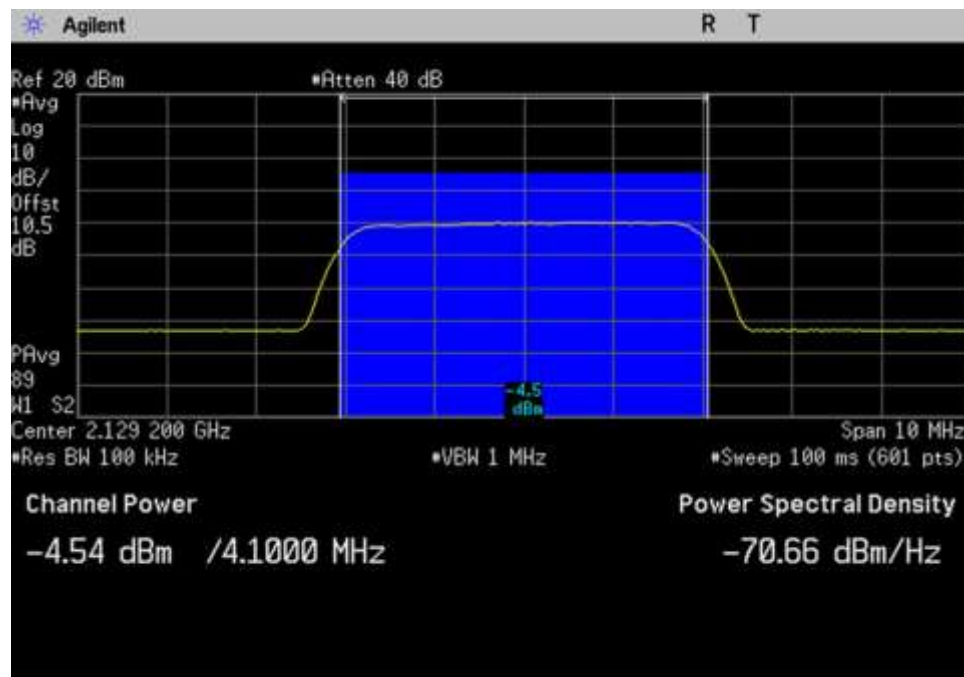
DL\_1930-1995\_AWGN\_ 1950.2MHz



DL\_1930-1995\_AWGN\_Max\_ 1950.2MHz

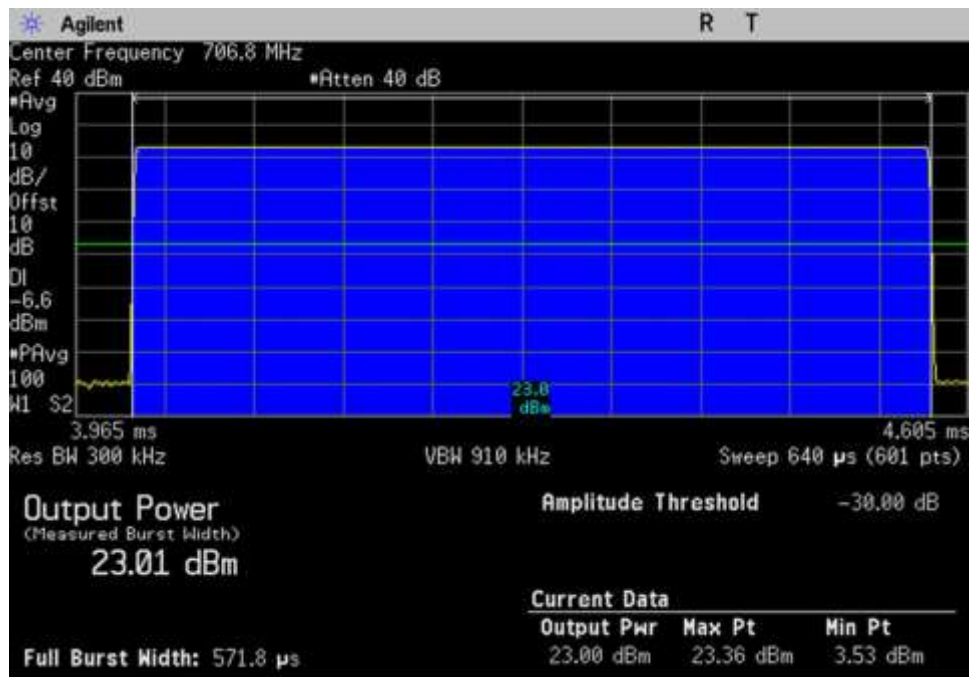


DL\_2110-2155\_AWGN\_ 2129.2MHz

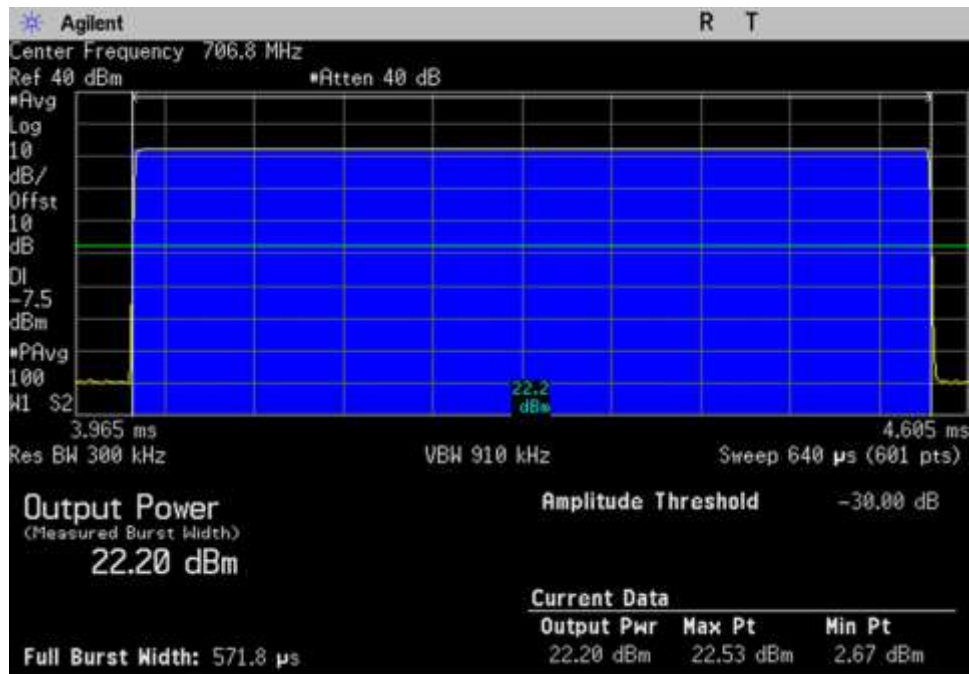


DL\_2110-2155\_AWGN\_Max\_ 2129.2MHz

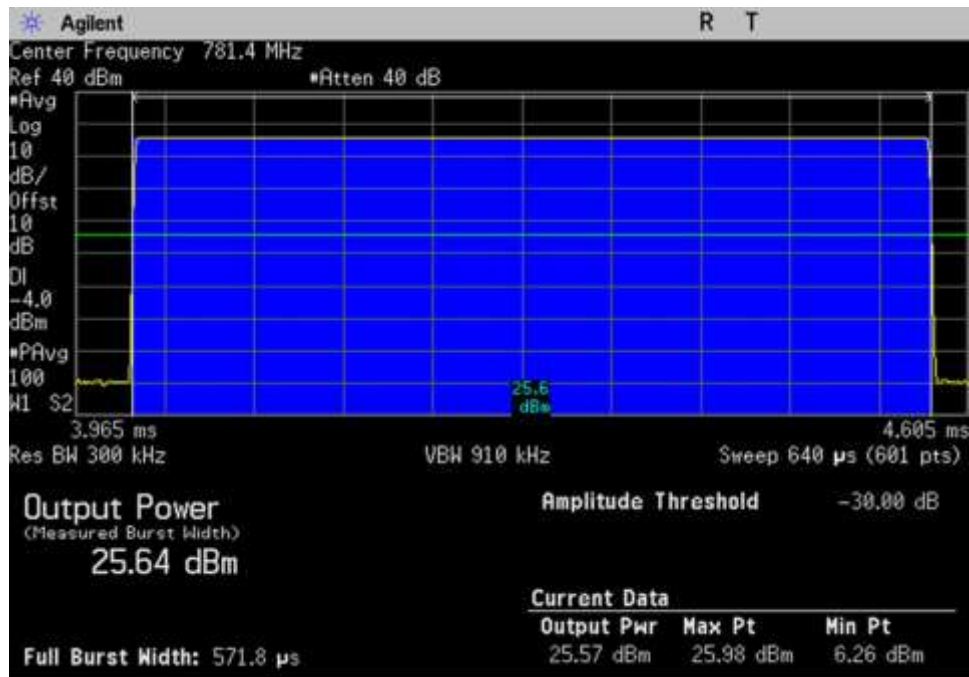
## GSM



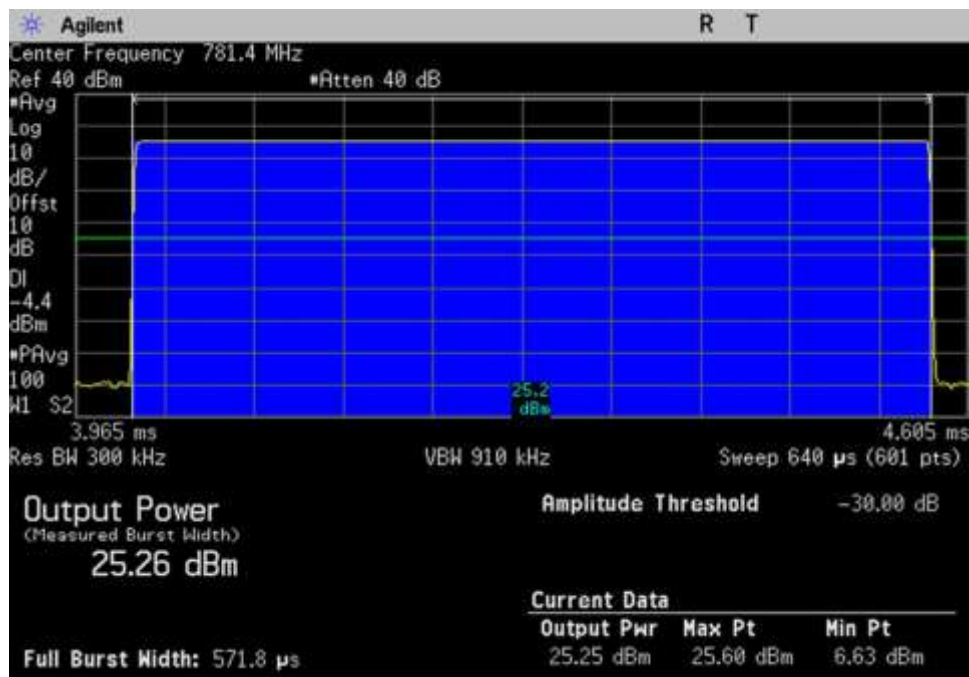
UL\_698-716\_GSM\_706.8MHz



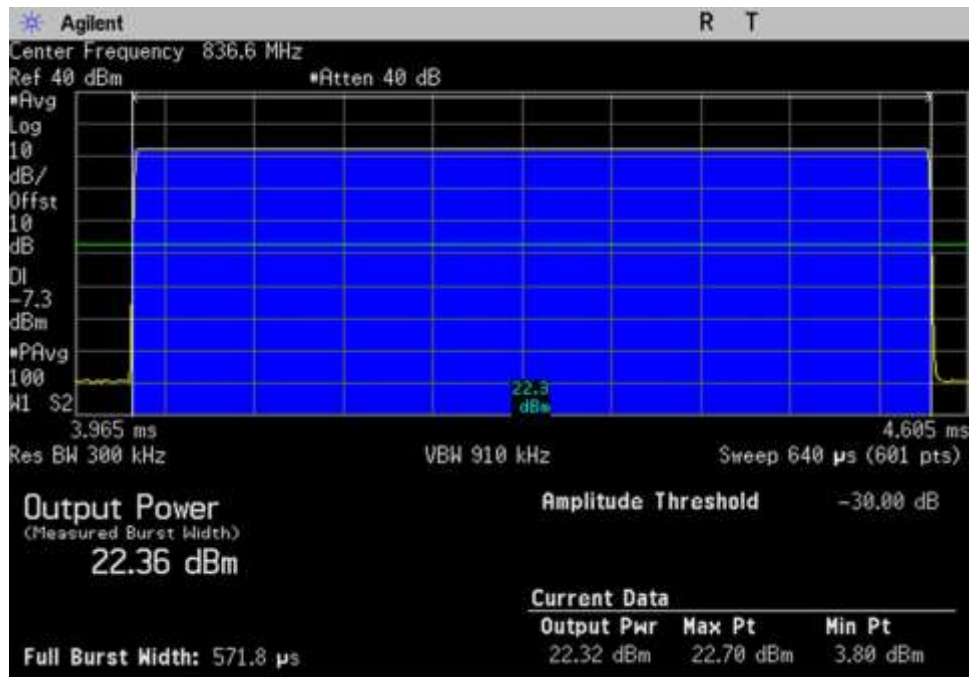
UL\_698-716\_GSM\_Max\_706.8MHz



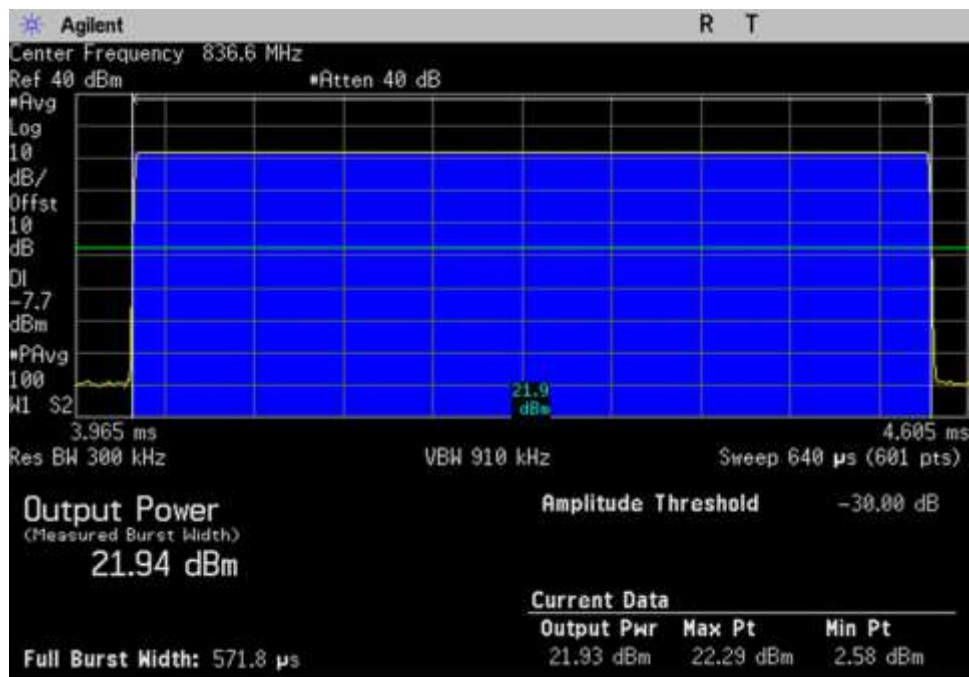
UL\_776-787\_GSM\_ 781.4MHz



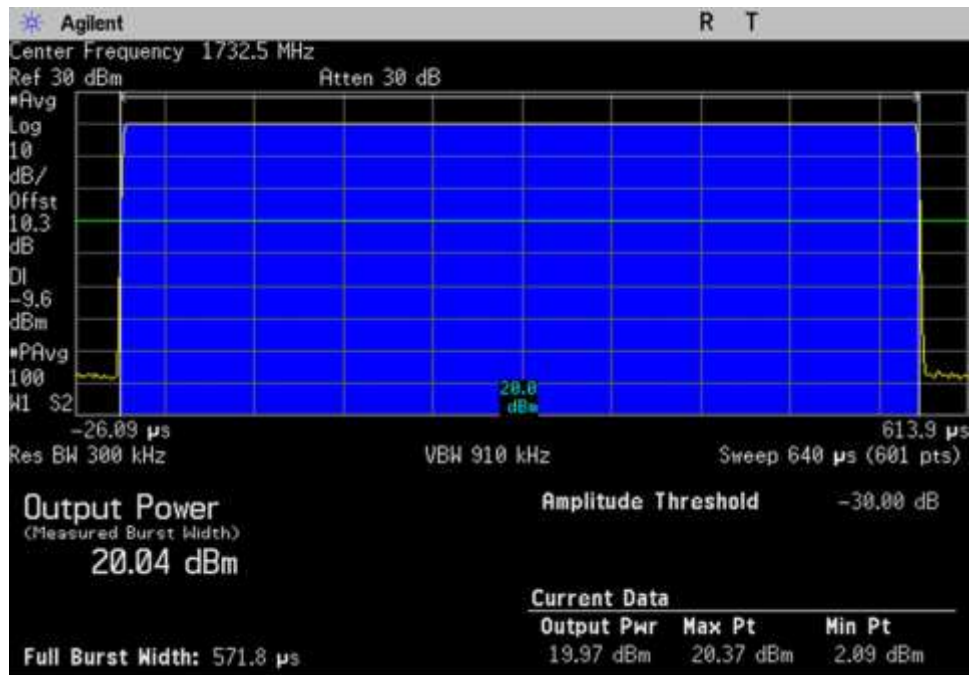
UL\_776-787\_GSM\_Max\_ 781.4MHz



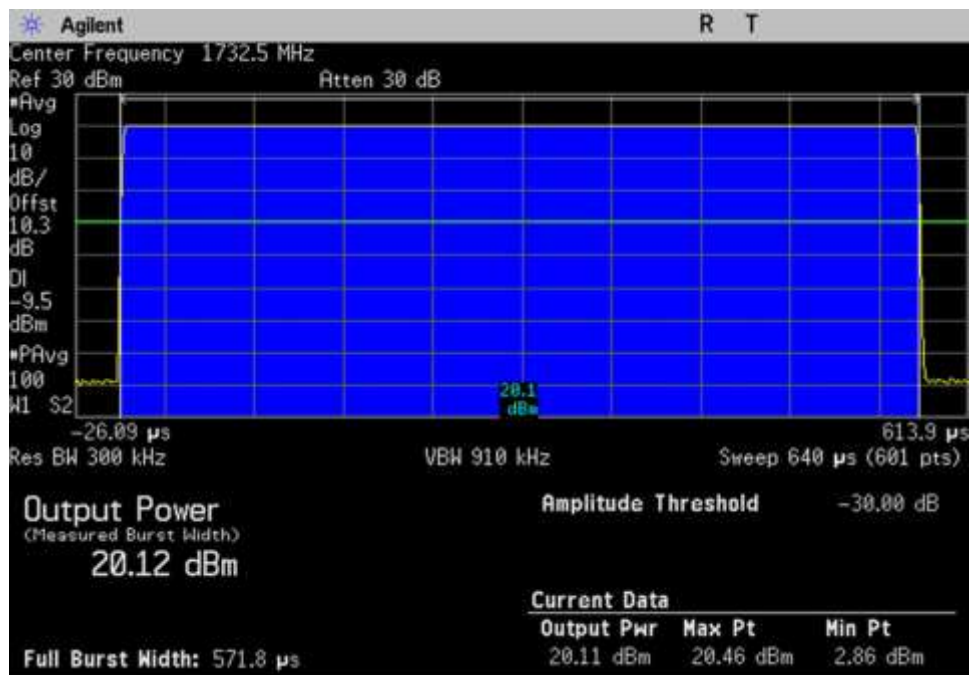
UL\_824-849\_GSM\_ 836.6MHz



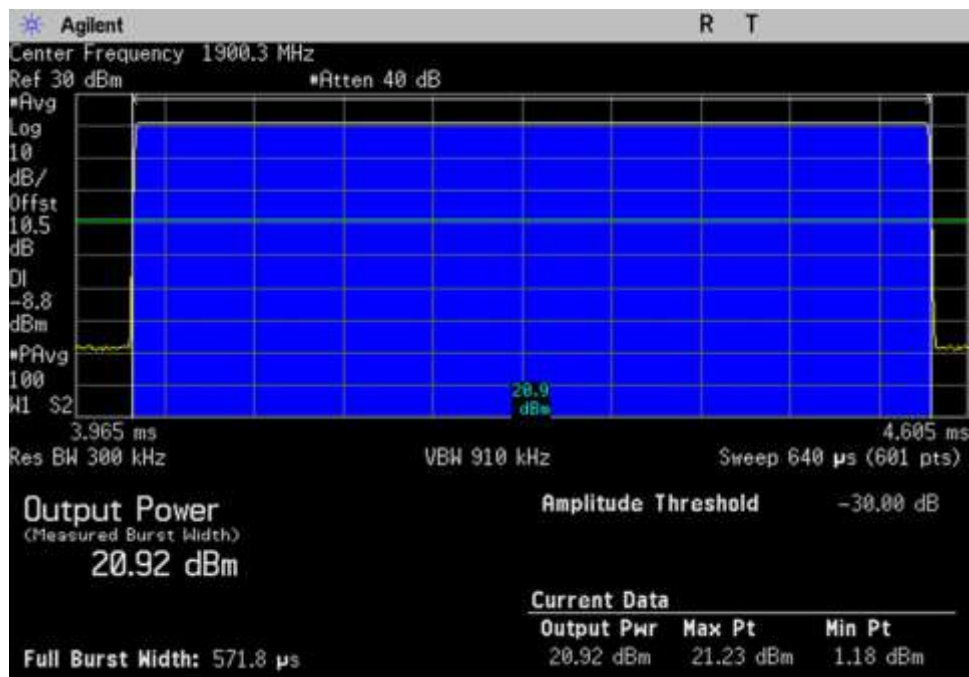
UL\_824-849\_GSM\_Max\_ 836.6MHz



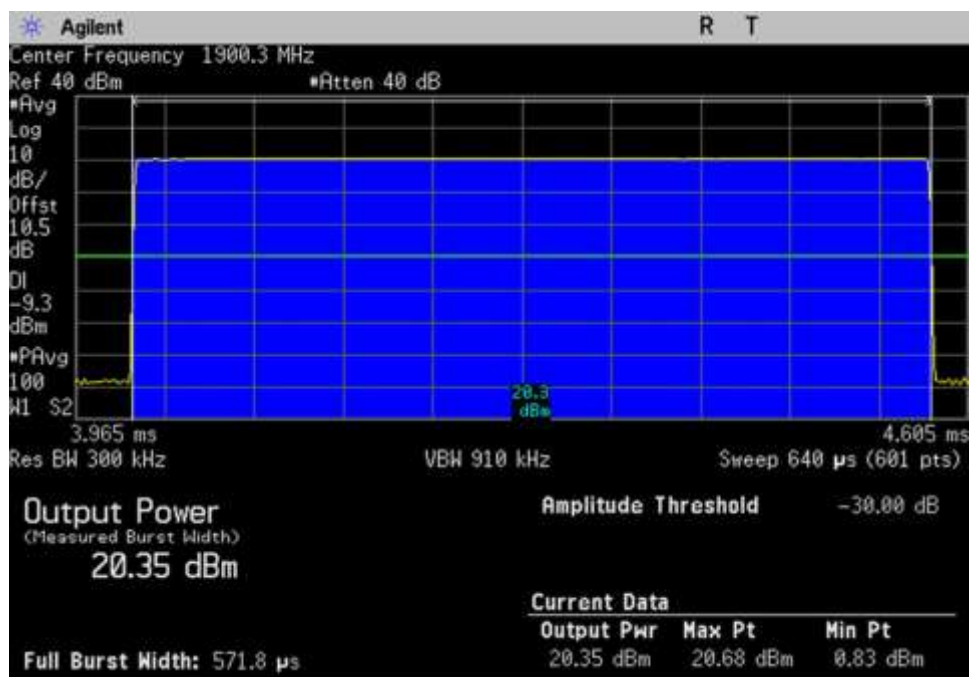
UL\_1710-1755\_GSM\_1732.5MHz



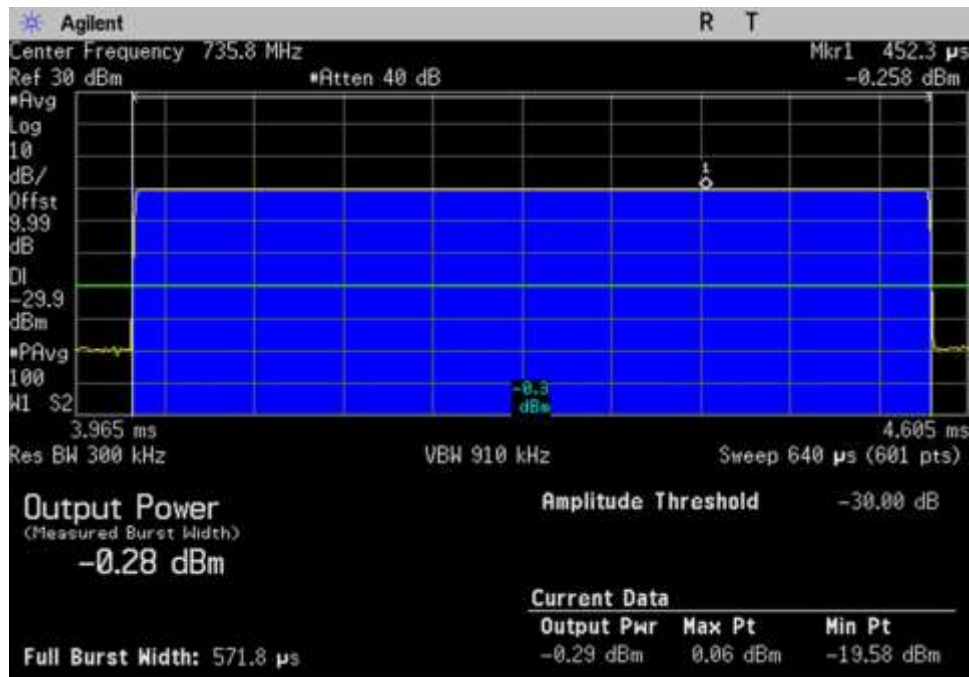
UL\_1710-1755\_GSM\_Max\_1732.5MHz



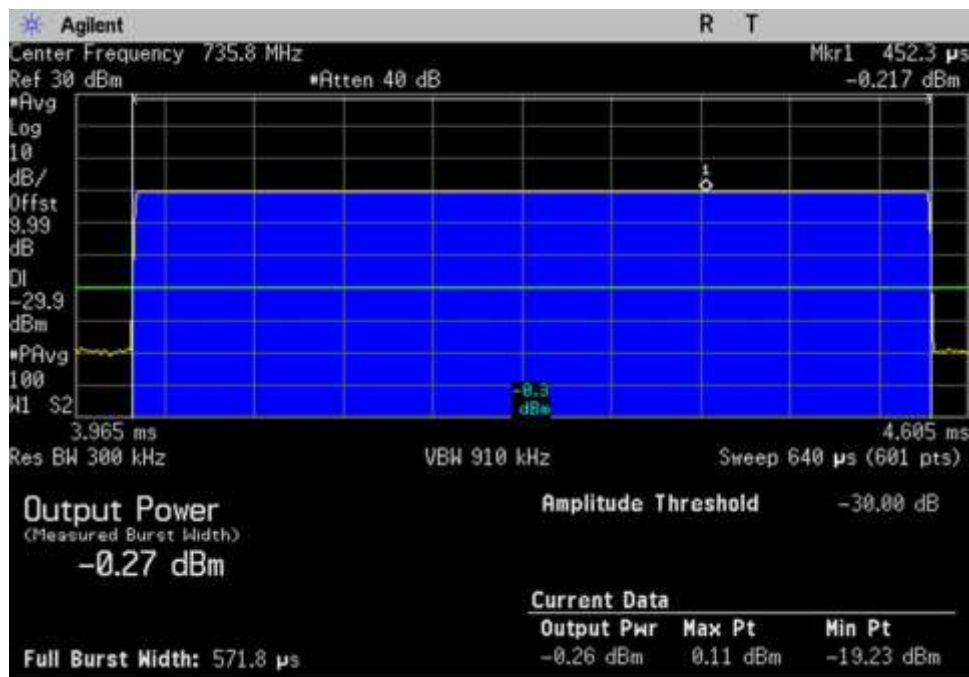
UL\_1850-1915\_GSM\_1900.3MHz



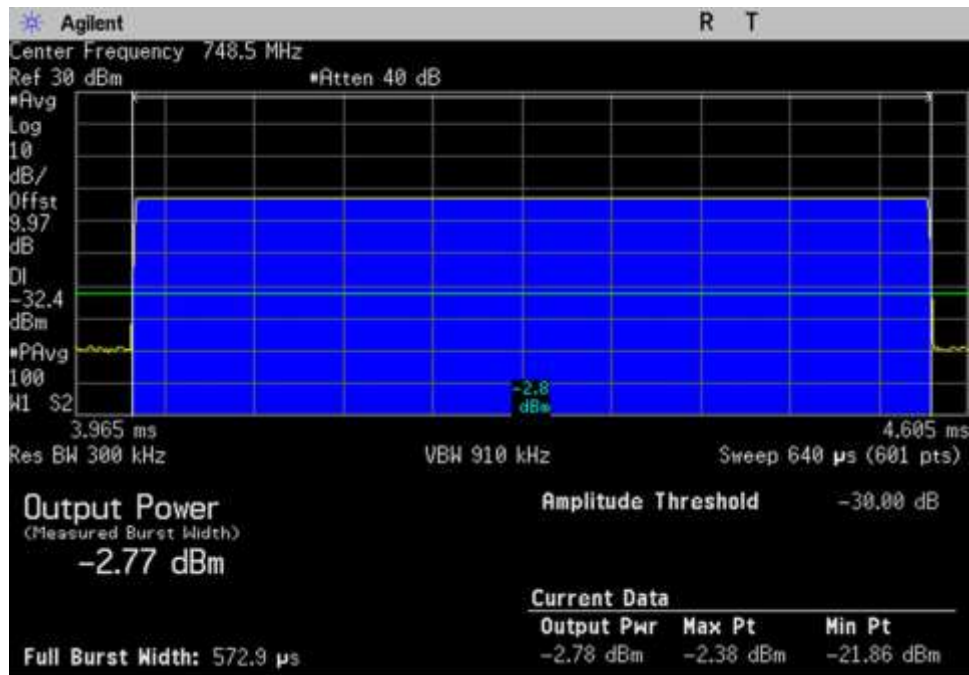
UL\_1850-1915\_GSM\_Max\_1900.3MHz



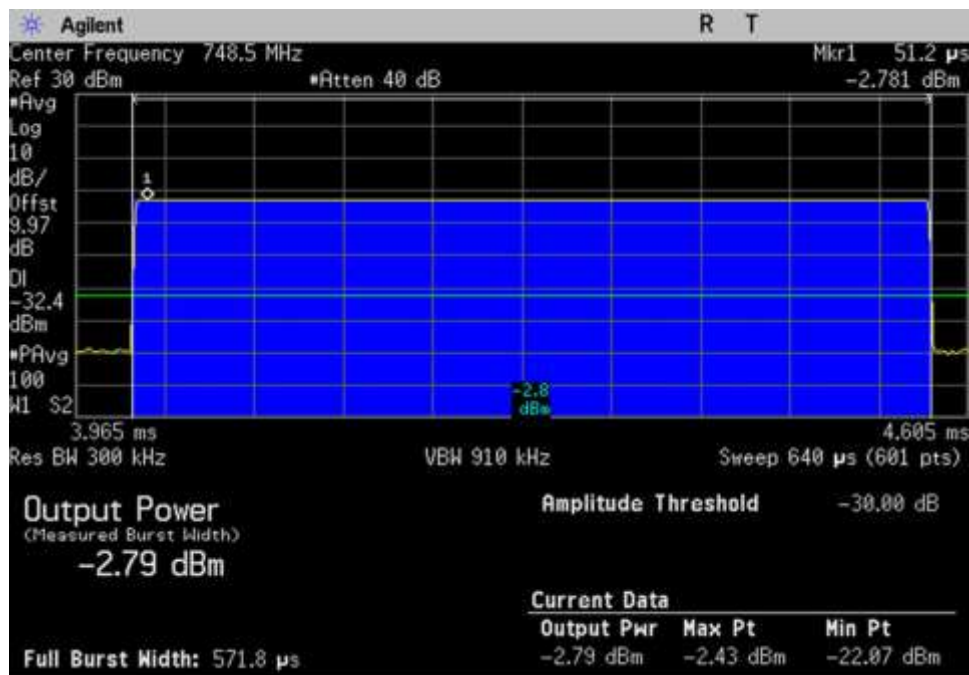
DL\_728-746\_GSM\_ 735.8MHz



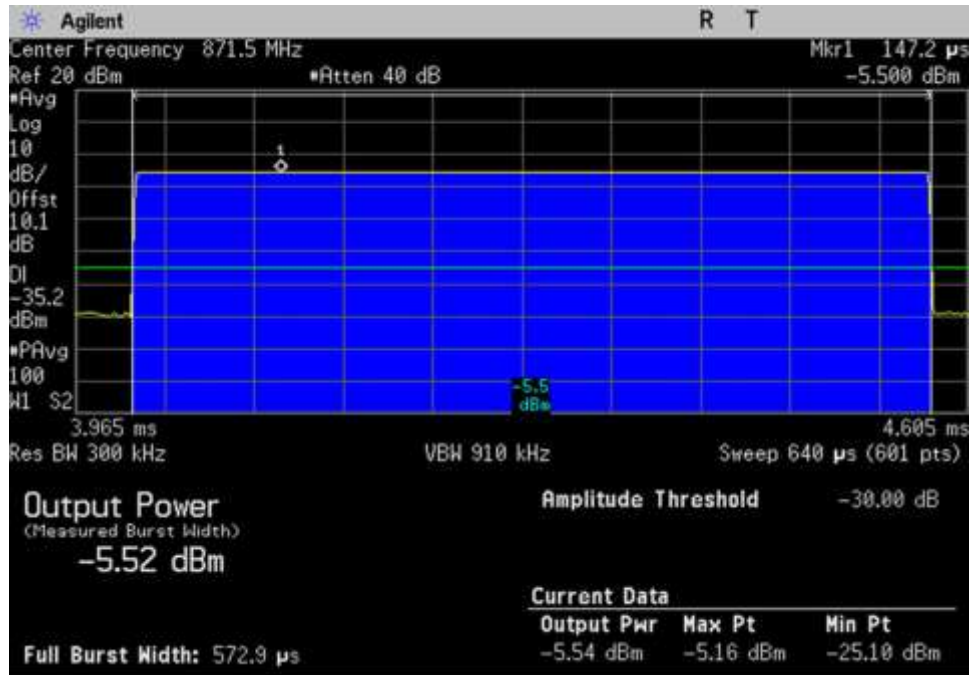
DL\_728-746\_GSM\_Max\_ 735.8MHz



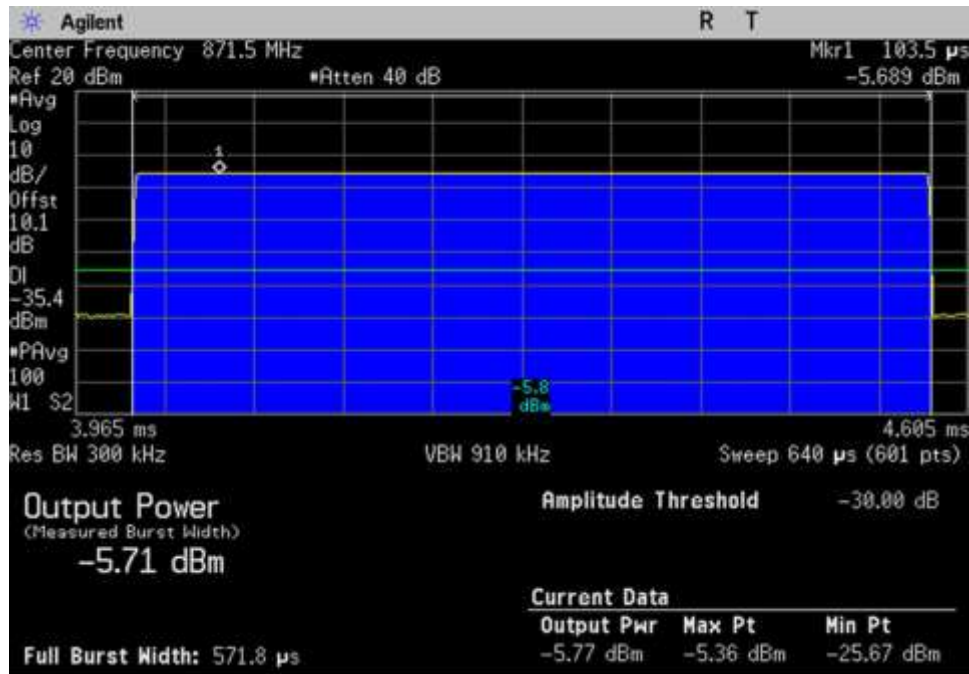
DL\_746-757\_GSM\_ 748.5MHz



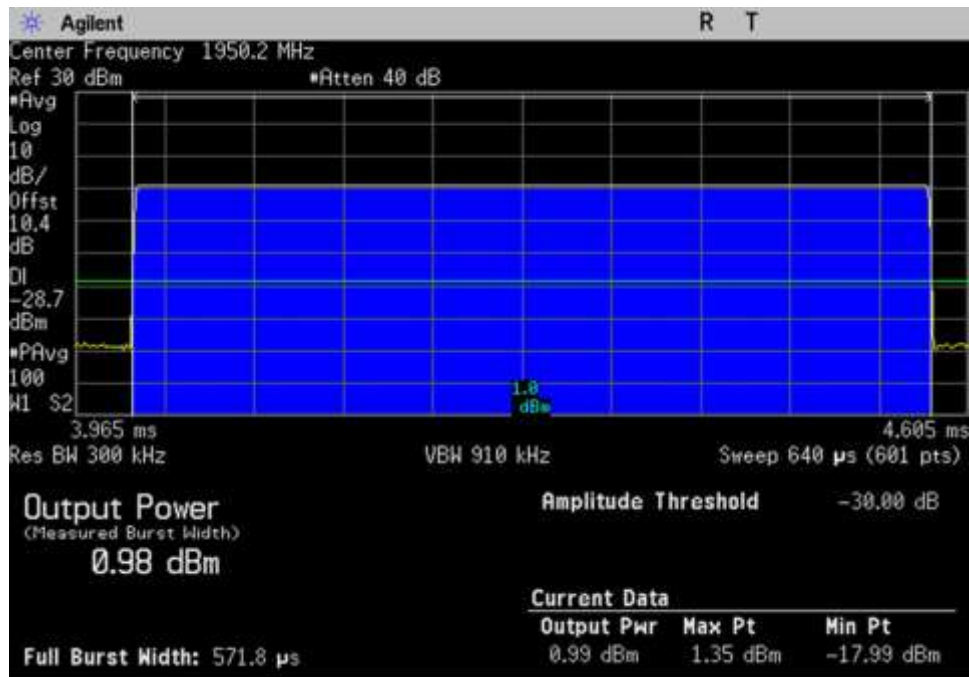
DL\_746-757\_GSM\_Max\_ 748.5MHz



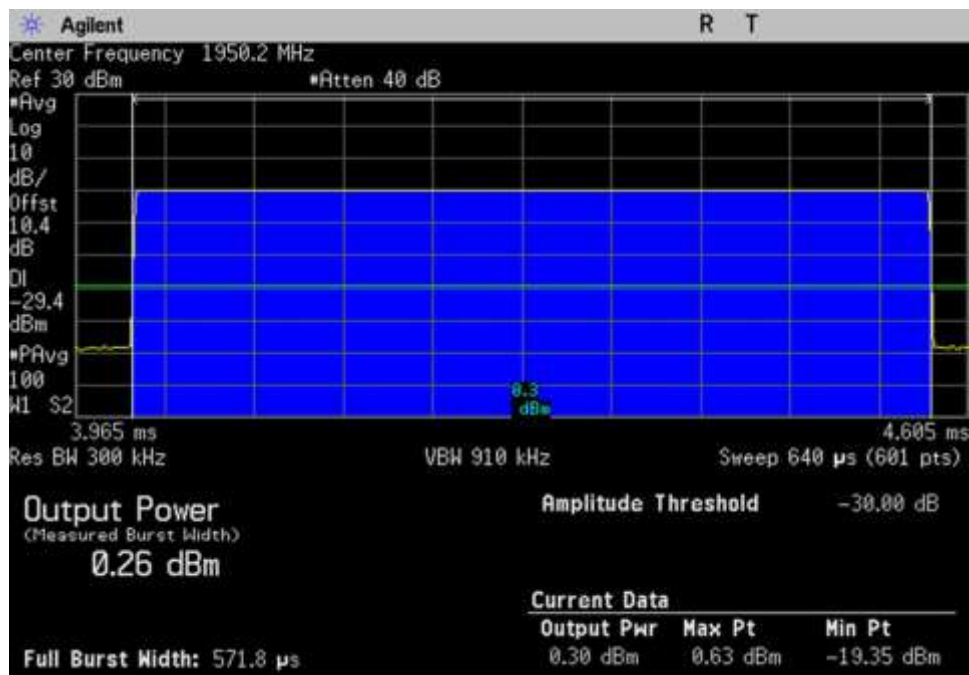
DL\_869-894\_GSM\_ 871.5MHz



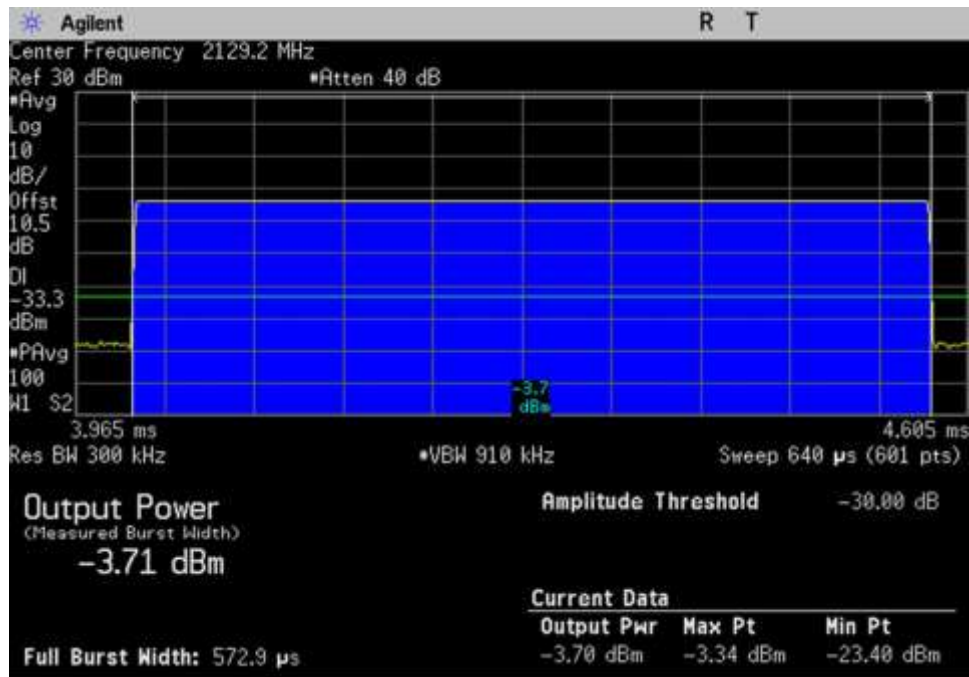
DL\_869-894\_GSM\_Max\_ 871.5MHz



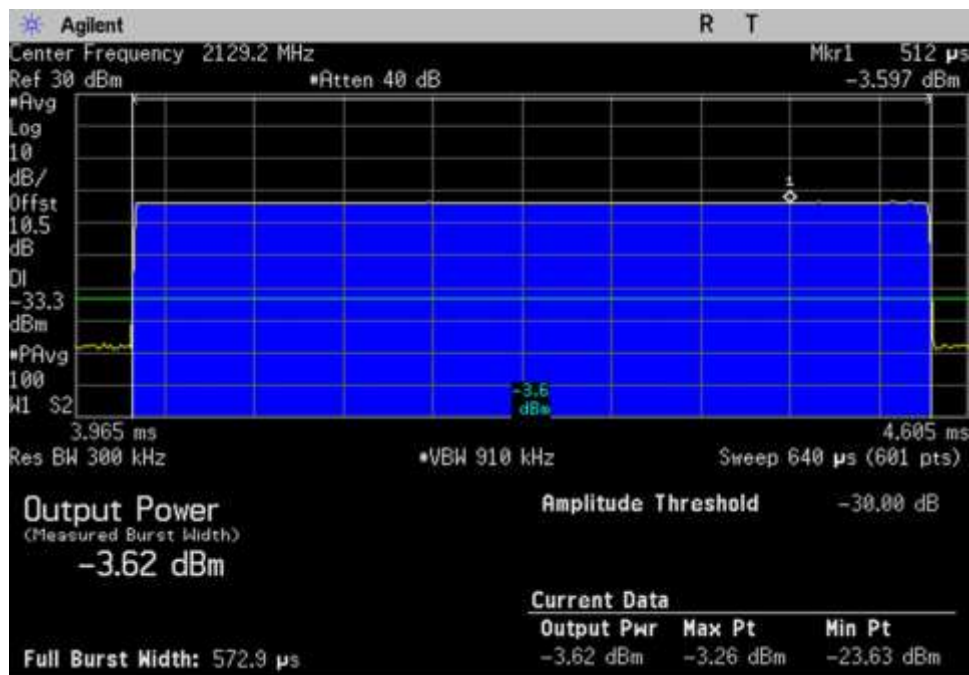
DL\_1930-1995\_GSM\_1950.2MHz



DL\_1930-1995\_GSM\_Max\_1950.2MHz



DL\_2110-2155\_GSM\_2129.2MHz



DL\_2110-2155\_GSM\_Max\_2129.2MHz

## 7.4 Intermodulation Product

### Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170  
 Customer: Cellphone-Mate, Inc.  
 Specification: **7.4 Intermodulation Product**  
 Work Order #: **101623** Date 08/07/18  
 Test Type: **Conducted Emissions**  
 Tested By: **Hieu S. Nguyenpham**  
 Software: EMITest 5.03.11

#### Equipment Tested:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

#### Support Equipment:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

#### Test Conditions / Notes:

Test environment conditions:  
 Temperature: 22.3°C  
 Relative Humidity: 45.6%  
 Pressure: 101.1kPa

#### Test Equipment:

| Asset # | Description       | Manufacturer | Model                    | Calibration Date | Cal Due Date |
|---------|-------------------|--------------|--------------------------|------------------|--------------|
| P05411  | Attenuator        | Weinschel    | 54A-10                   | 1/19/2018        | 1/19/2020    |
| P07192  | Cable             | Astro        | 32022-29094K-29094K-48TC | 10/9/2017        | 10/9/2019    |
| P07191  | Cable             | Astro        | 32022-29094K-29094K-48TC | 10/30/2017       | 10/30/2019   |
| 03418   | Signal Generator  | Agilent      | E4438C                   | 6/19/2017        | 6/19/2019    |
| 03470   | Spectrum Analyzer | Agilent      | E4440A                   | 1/3/2018         | 1/3/2020     |

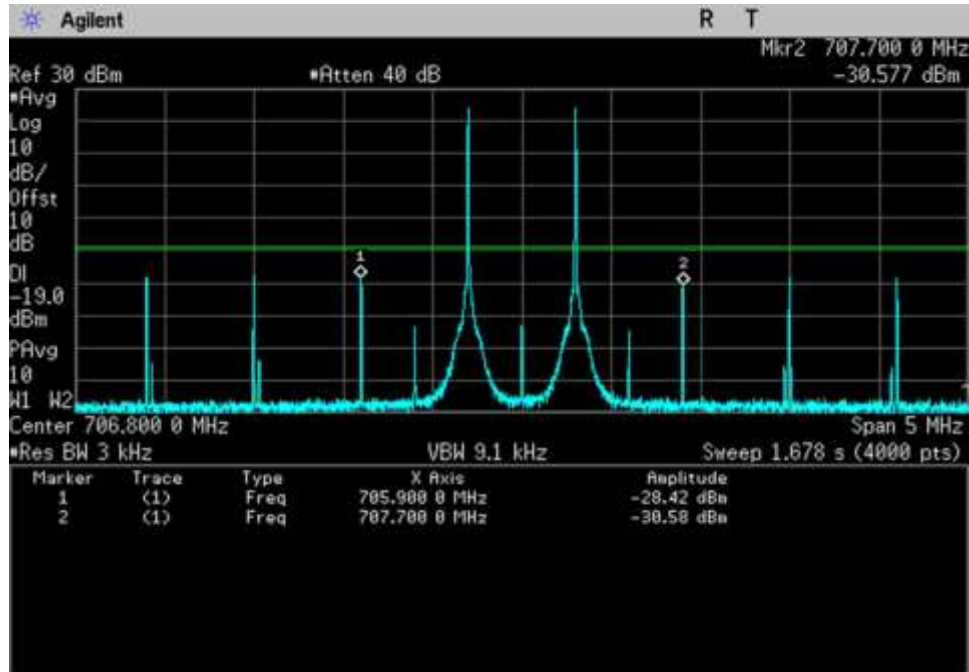
## Summary of Results

Pass: As shown on the plots, all intermodulation products are measured below -19dbm limit.

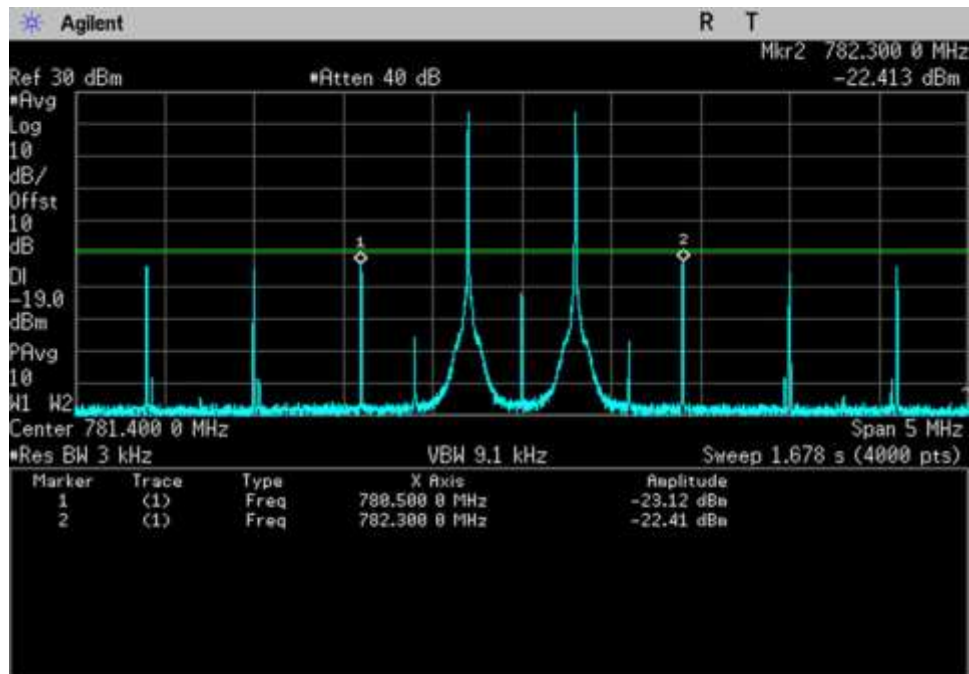
| Inter Modulation Product |               |             |         |
|--------------------------|---------------|-------------|---------|
| Frequency (MHz)          | Pre AGC (dBm) | Limit (dBm) | Results |
| UL 1710-1755             | -27.2         | -19         | Pass    |
| UL 1850-1915             | -29.5         | -19         | Pass    |
| UL 824-894               | -25.4         | -19         | Pass    |
| UL 698-716               | -28.4         | -19         | Pass    |
| UL 776-787               | -22.4         | -19         | Pass    |
|                          |               |             |         |
| DL 2110-2155             | -56.9         | -19         | Pass    |
| DL 1930-1995             | -57.3         | -19         | Pass    |
| DL 869-894               | -70.4         | -19         | Pass    |
| DL 728-746               | -58.9         | -19         | Pass    |
| DL 746-757               | -66.6         | -19         | Pass    |

Note: The EUT maintains compliance with the intermodulation limit at input power of AGC+10dB

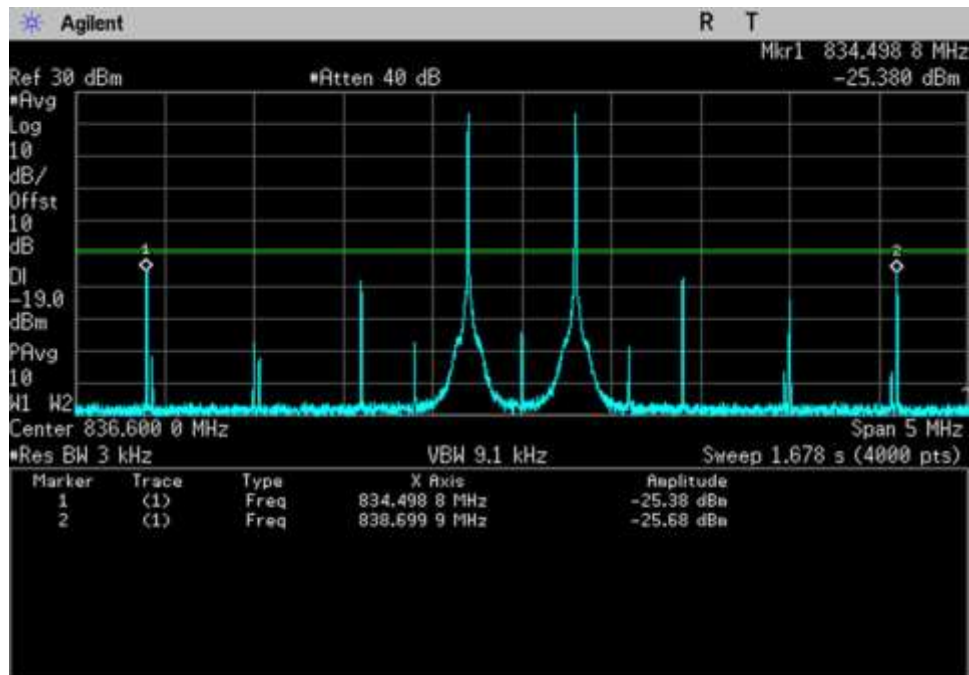
## Plots



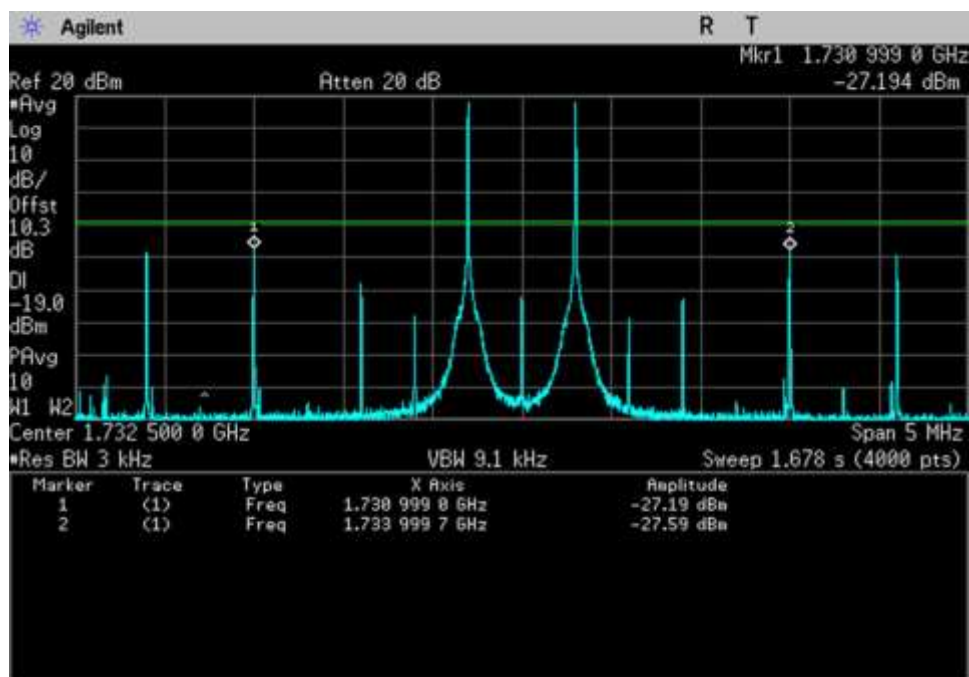
UL\_698-716\_706.8MHz



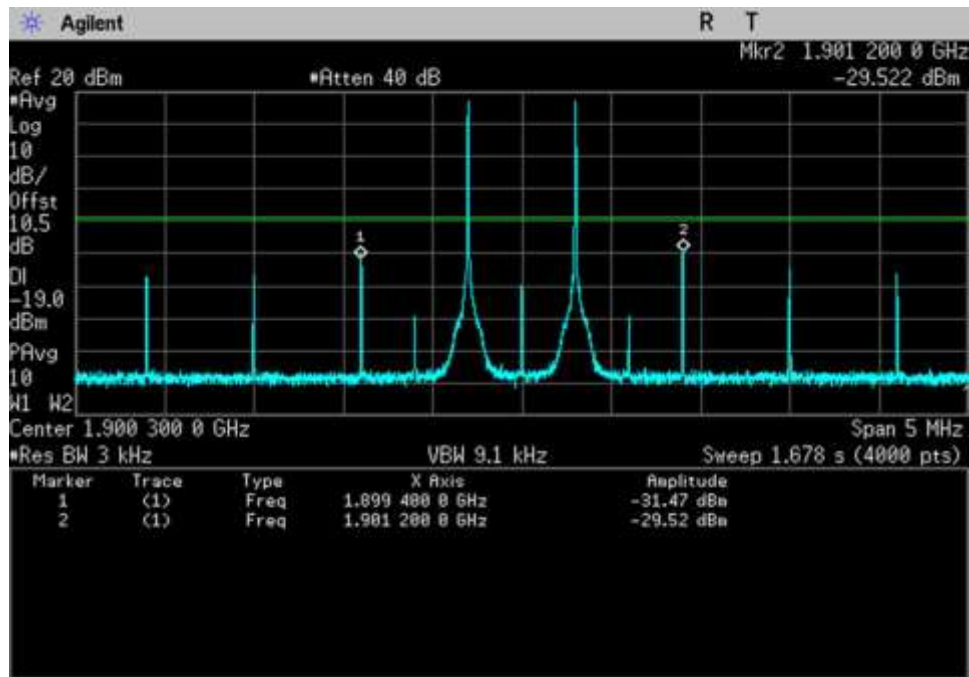
UL\_776-787\_781.4MHz



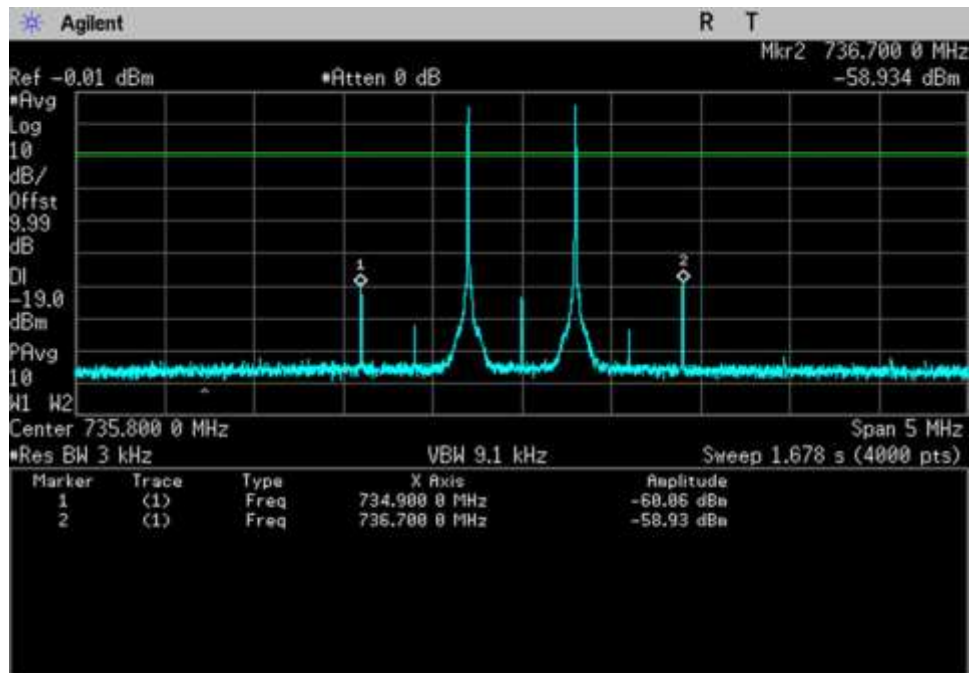
UL\_824-849\_ 836.6MHz



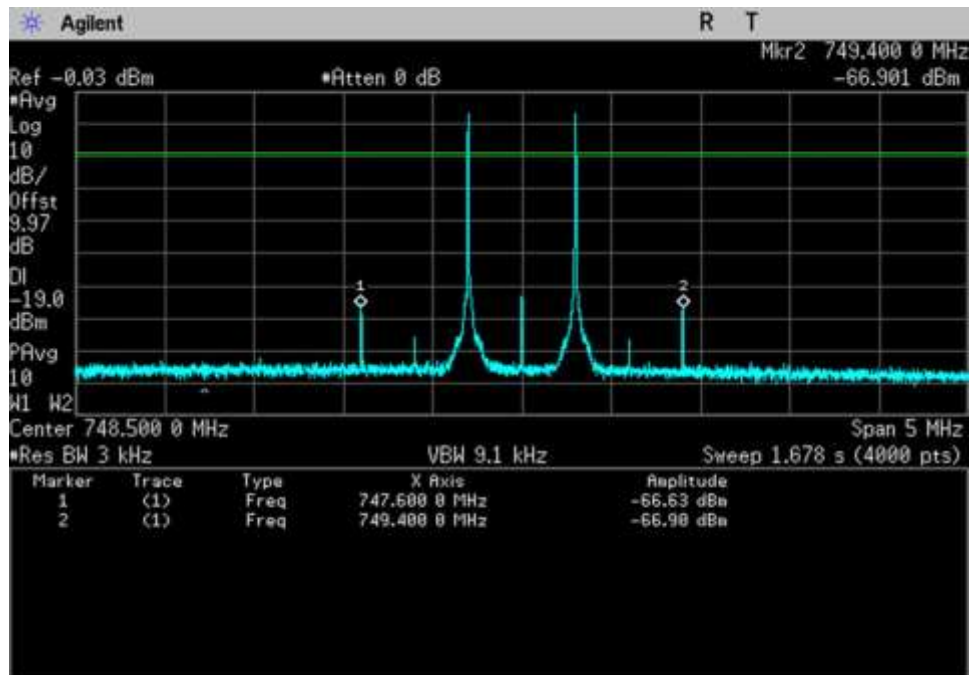
UL\_1710-1755\_ 1732.5MHz



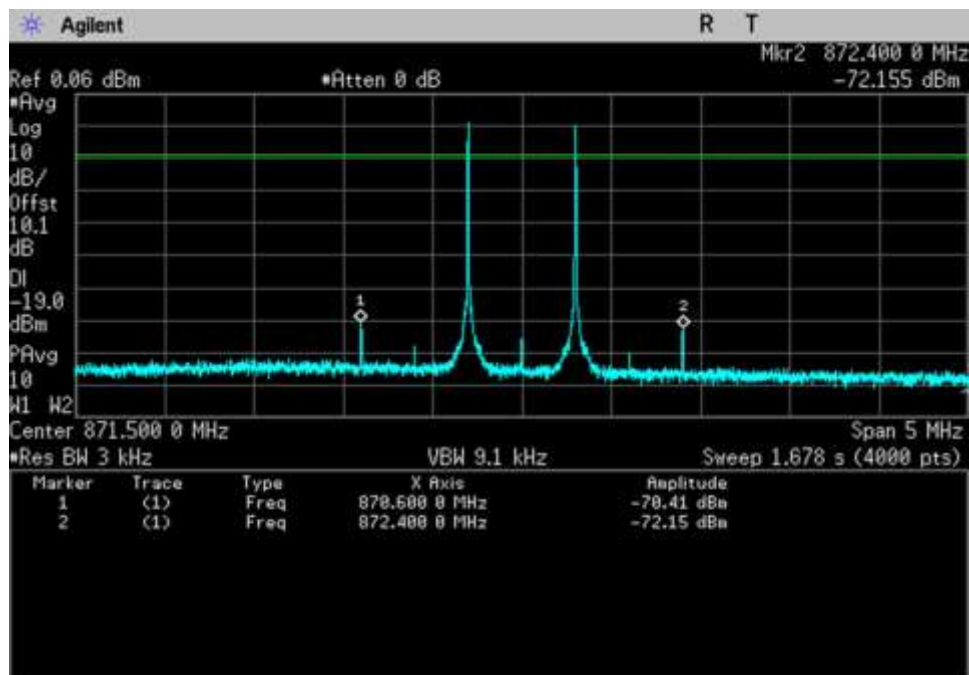
UL\_1850-1915\_ 1900.3MHz



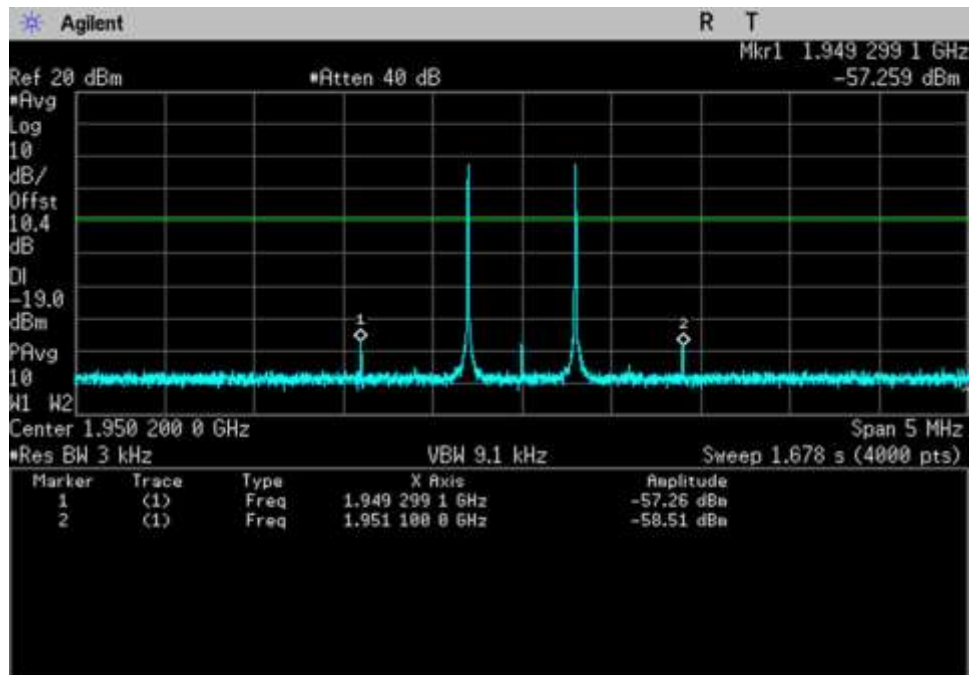
DL\_728-746\_ 735.8MHz



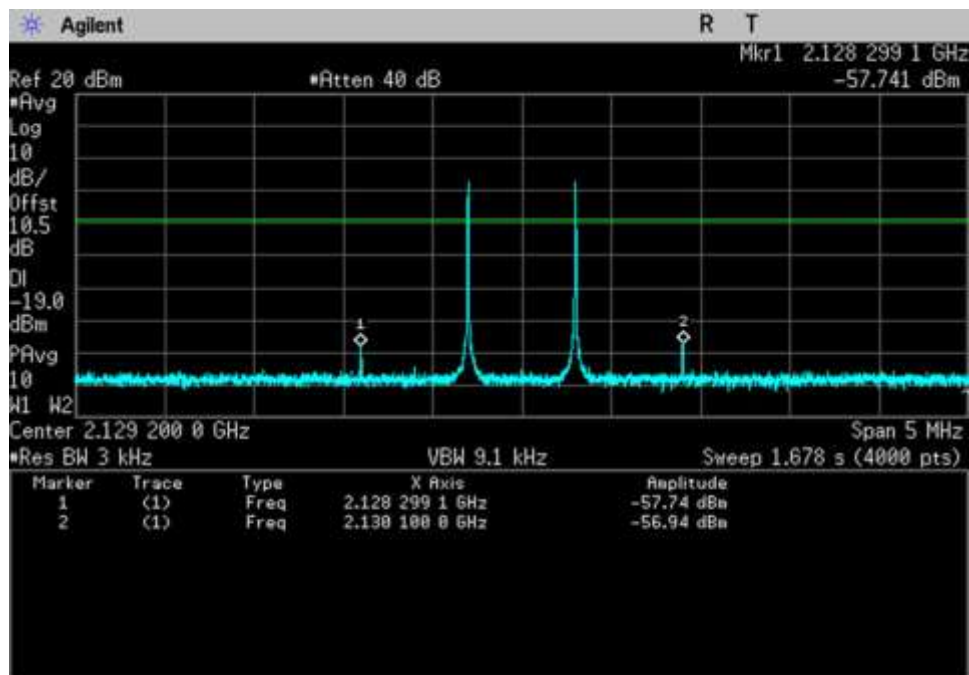
DL\_746-757\_ 748.5MHz



DL\_869-894\_ 871.5MHz



DL\_1930-1995\_ 1950.2MHz



DL\_2110-2155\_ 2129.2MHz

## 7.5 Out of Band Emissions

### Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170  
 Customer: Cellphone-Mate, Inc.  
 Specification: **7.5 Out-of-band Emissions**  
 Work Order #: **101623** Date 08/07/18 and 08/14/18  
 Test Type: **Conducted Emissions**  
 Tested By: **Hieu Song Nguyenpham**  
 Software: EMITest 5.03.11

#### Equipment Tested:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

#### Support Equipment:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

#### Test Conditions / Notes:

##### 08/07/18: Test environment conditions:

Temperature: 22.3°C  
 Relative Humidity: 45.6%  
 Pressure: 101.1kPa

##### 08/14/18: Test environment conditions:

Temperature: 22.6°C  
 Relative Humidity: 48%  
 Pressure: 101.9kPa

#### Test Equipment:

| Asset # | Description       | Manufacturer | Model                    | Calibration Date | Cal Due Date |
|---------|-------------------|--------------|--------------------------|------------------|--------------|
| P05411  | Attenuator        | Weinschel    | 54A-10                   | 1/19/2018        | 1/19/2020    |
| P07192  | Cable             | Astro        | 32022-29094K-29094K-48TC | 10/9/2017        | 10/9/2019    |
| P07191  | Cable             | Astro        | 32022-29094K-29094K-48TC | 10/30/2017       | 10/30/2019   |
| 03418   | Signal Generator  | Agilent      | E4438C                   | 6/19/2017        | 6/19/2019    |
| 03470   | Spectrum Analyzer | Agilent      | E4440A                   | 1/3/2018         | 1/3/2020     |

## Summary of Results

Pass: As indicated in plots below, all OBE are under the limit of -19dBm.

### GSM

| Low                  |         |             |         | High                 |         |             |         |
|----------------------|---------|-------------|---------|----------------------|---------|-------------|---------|
| Out of Band Emission |         |             |         | Out of Band Emission |         |             |         |
| Frequency (MHz)      | Pre AGC | Limit (dBm) | Results | Frequency (MHz)      | Pre AGC | Limit (dBm) | Results |
| UL1710-1755          | -26.8   | -19         | Pass    | UL1710-1755          | -26.5   | -19         | Pass    |
| UL1850-1915          | -27.0   | -19         | Pass    | UL1850-1915          | -31.7   | -19         | Pass    |
| UL824-849            | -19.9   | -19         | Pass    | UL824-849            | -22.0   | -19         | Pass    |
| UL 698-716           | -19.7   | -19         | Pass    | UL 698-716           | -20.1   | -19         | Pass    |
| UL776-787            | -20.8   | -19         | Pass    | UL776-787            | -19.5   | -19         | Pass    |
|                      |         |             |         |                      |         |             |         |
| DL2110-2155          | -48.7   | -19         | Pass    | DL2110-2155          | -50.8   | -19         | Pass    |
| DL1930-1995          | -47.2   | -19         | Pass    | DL1930-1995          | -51.7   | -19         | Pass    |
| DL869-894            | -46.1   | -19         | Pass    | DL869-894            | -51.4   | -19         | Pass    |
| DL:728-746           | -51.5   | -19         | Pass    | DL:728-746           | -48.9   | -19         | Pass    |
| DL 746-757           | -48.1   | -19         | Pass    | DL 746-757           | -54.8   | -19         | Pass    |

### CDMA (alternative 1.25 MHz AWGN)

| Low                  |         |             |         | High                 |         |             |         |
|----------------------|---------|-------------|---------|----------------------|---------|-------------|---------|
| Out of Band Emission |         |             |         | Out of Band Emission |         |             |         |
| Frequency (MHz)      | Pre AGC | Limit (dBm) | Results | Frequency (MHz)      | Pre AGC | Limit (dBm) | Results |
| UL1710-1755          | -36.9   | -19         | Pass    | UL1710-1755          | -35.2   | -19         | Pass    |
| UL1850-1915          | -31.8   | -19         | Pass    | UL1850-1915          | -40.8   | -19         | Pass    |
| UL824-849            | -28.0   | -19         | Pass    | UL824-849            | -29.0   | -19         | Pass    |
| UL 698-716           | -23.4   | -19         | Pass    | UL 698-716           | -26.2   | -19         | Pass    |
| UL776-787            | -31.7   | -19         | Pass    | UL776-787            | -24.0   | -19         | Pass    |
|                      |         |             |         |                      |         |             |         |
| DL2110-2155          | -62.8   | -19         | Pass    | DL2110-2155          | -61.3   | -19         | Pass    |
| DL1930-1995          | -64.8   | -19         | Pass    | DL1930-1995          | -68.3   | -19         | Pass    |
| DL869-894            | -69.3   | -19         | Pass    | DL869-894            | -75.0   | -19         | Pass    |
| DL:728-746           | -74.6   | -19         | Pass    | DL:728-746           | -73.8   | -19         | Pass    |
| DL 746-757           | -70.3   | -19         | Pass    | DL 746-757           | -75.3   | -19         | Pass    |

**LTE (alternative 4.1MHz AWGN)**

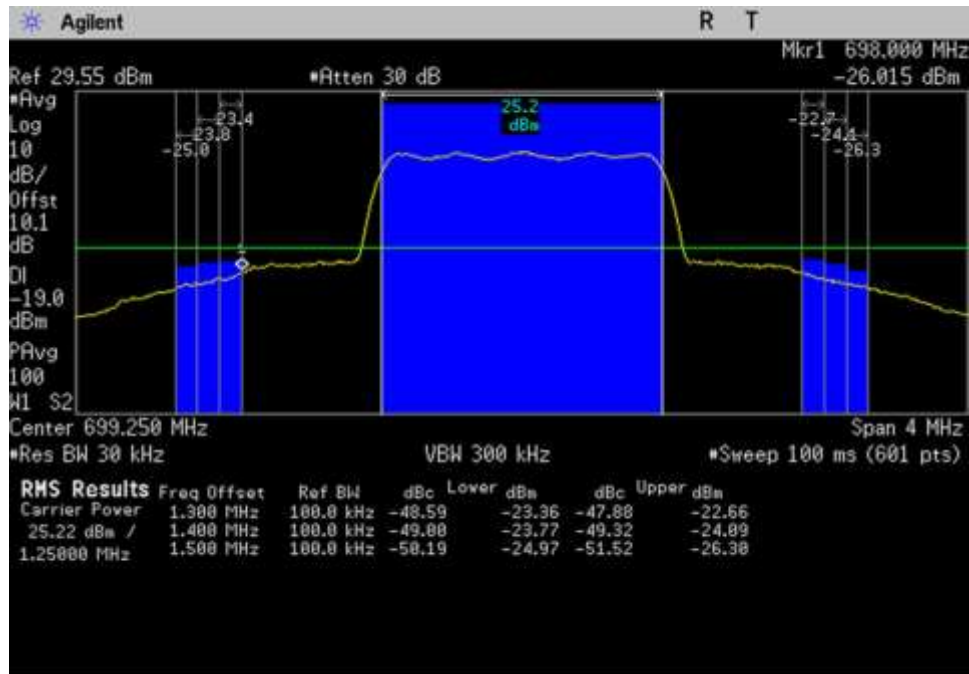
| Low                  |         |             |         |
|----------------------|---------|-------------|---------|
| Out of Band Emission |         |             |         |
| Frequency (MHz)      | Pre AGC | Limit (dBm) | Results |
| UL1710-1755          | -34.7   | -19         | Pass    |
| UL1850-1915          | -32.7   | -19         | Pass    |
| UL824-849            | -29.1   | -19         | Pass    |
| UL 698-716           | -25.8   | -19         | Pass    |
| UL776-787            | -28.7   | -19         | Pass    |
|                      |         |             |         |
| DL2110-2155          | -53.7   | -19         | Pass    |
| DL1930-1995          | -53.7   | -19         | Pass    |
| DL869-894            | -57.7   | -19         | Pass    |
| DL:728-746           | -61.6   | -19         | Pass    |
| DL 746-757           | -55.7   | -19         | Pass    |

| High                 |         |             |         |
|----------------------|---------|-------------|---------|
| Out of Band Emission |         |             |         |
| Frequency (MHz)      | Pre AGC | Limit (dBm) | Results |
| UL1710-1755          | -33.0   | -19         | Pass    |
| UL1850-1915          | -38.0   | -19         | Pass    |
| UL824-849            | -32.7   | -19         | Pass    |
| UL 698-716           | -29.3   | -19         | Pass    |
| UL776-787            | -27.8   | -19         | Pass    |
|                      |         |             |         |
| DL2110-2155          | -55.8   | -19         | Pass    |
| DL1930-1995          | -57.8   | -19         | Pass    |
| DL869-894            | -61.5   | -19         | Pass    |
| DL:728-746           | -59.6   | -19         | Pass    |
| DL 746-757           | -66.1   | -19         | Pass    |

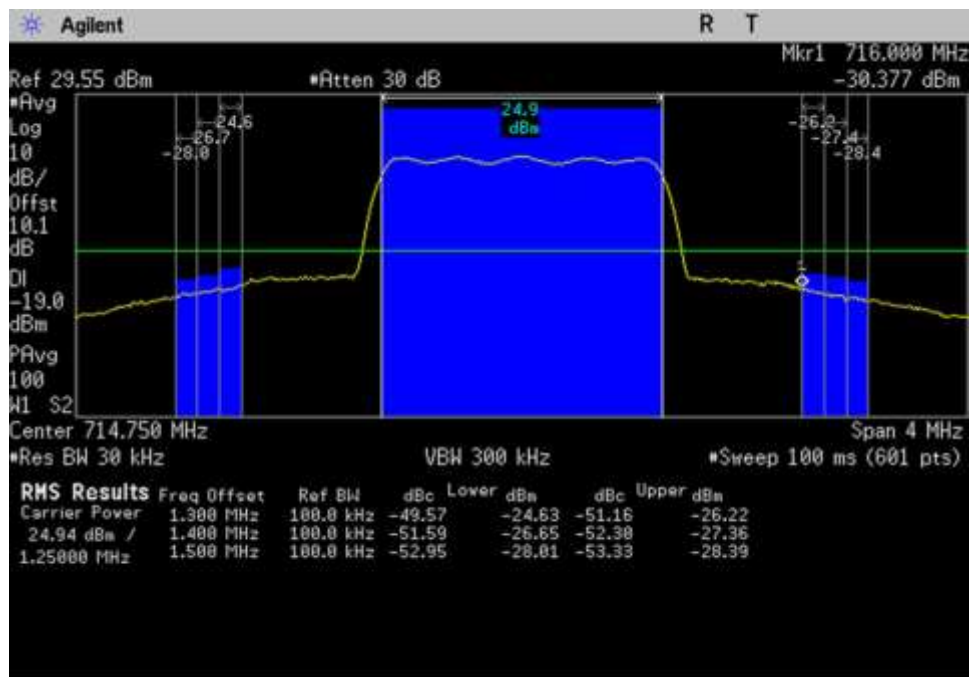
Note: The EUT also maintains compliance with the out-of-band emissions limit at input power indicated in section 5.5.

## Plots

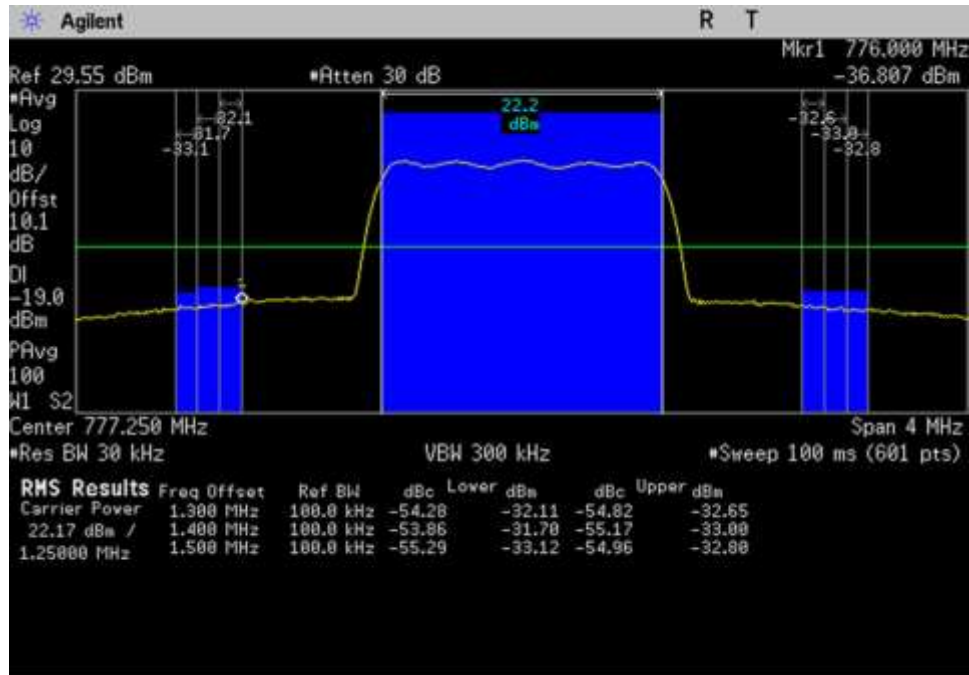
### CDMA



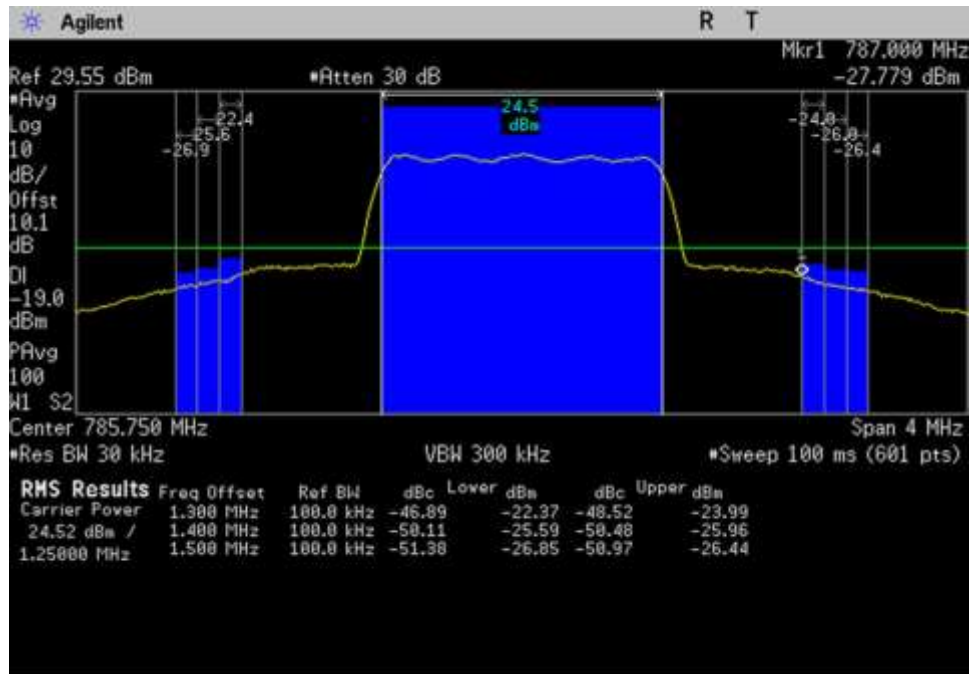
UL\_698-716\_CDMA\_697.25-701.25MHz



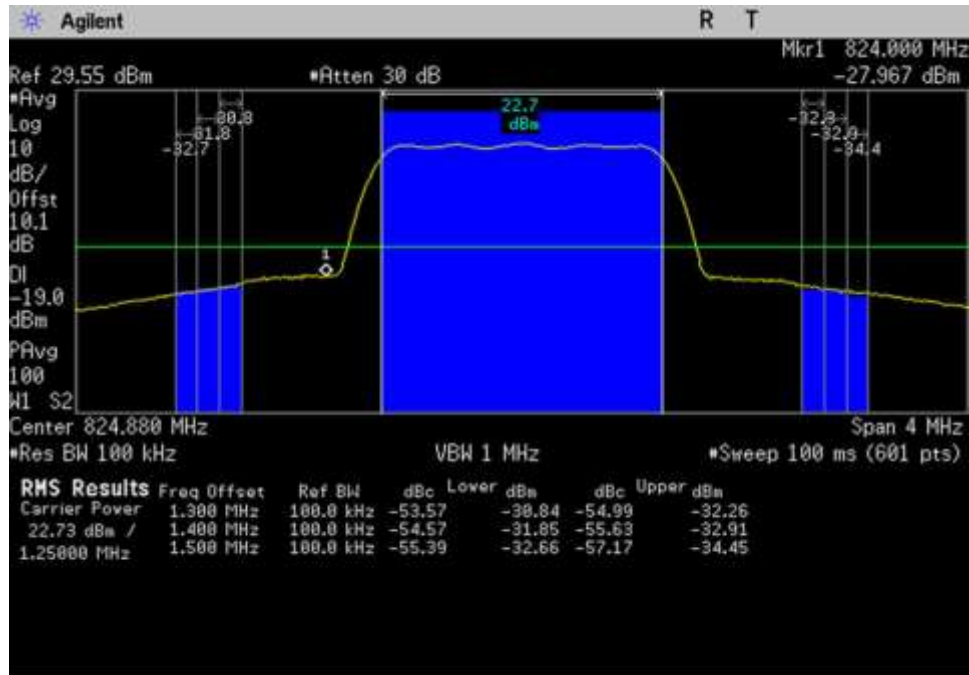
UL\_698-716\_CDMA\_712.75-716.75MHz



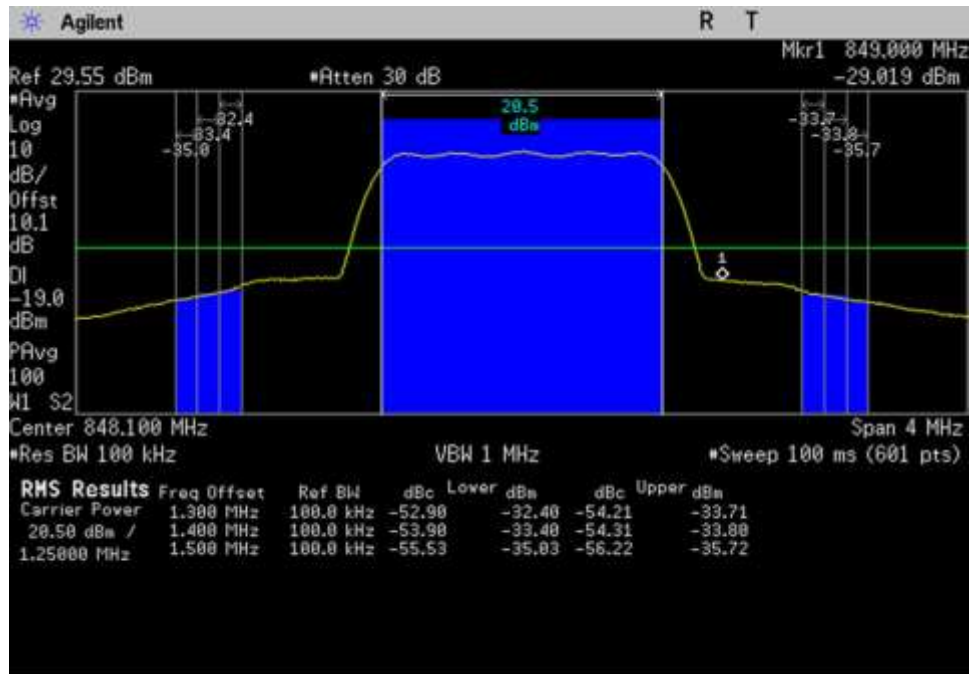
UL\_776-787\_CDMA\_775.25-779.25MHz



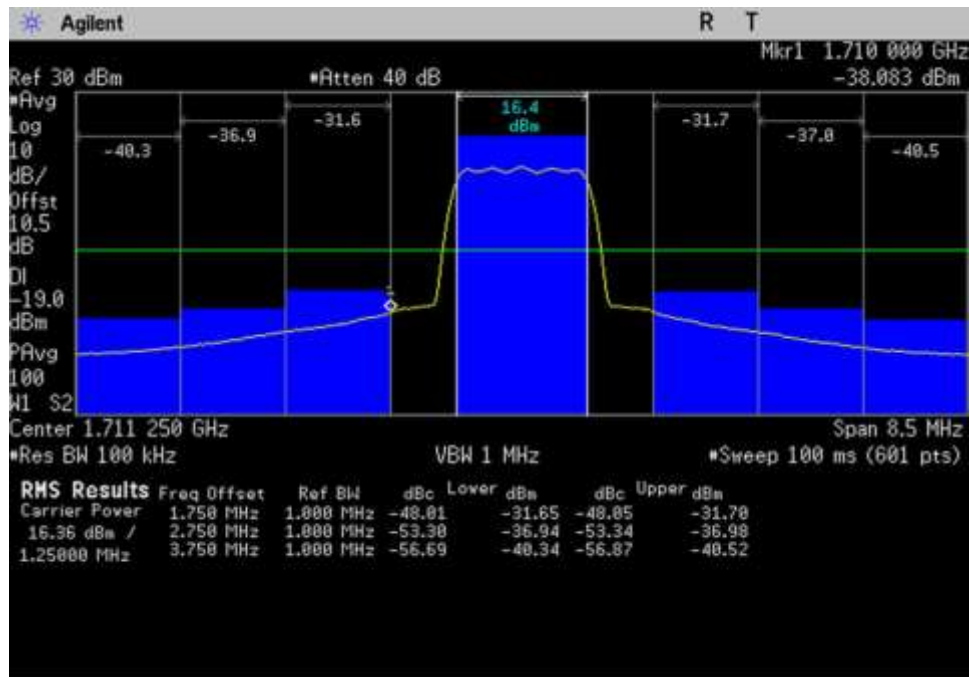
UL\_776-787\_CDMA\_783.75-787.75MHz



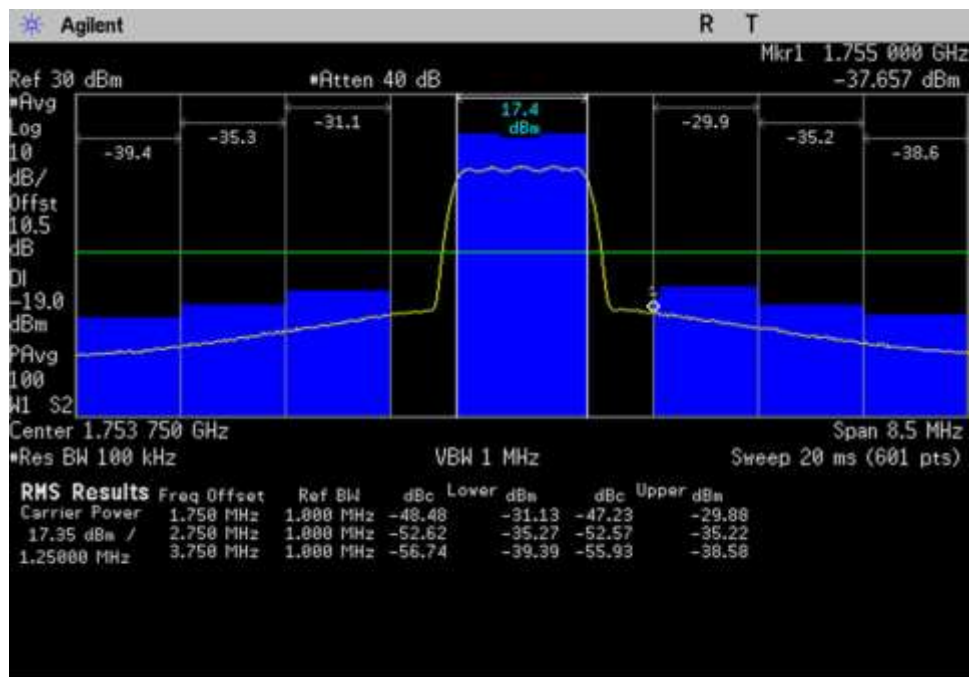
UL\_824-849\_CDMA\_822.88-826.88MHz



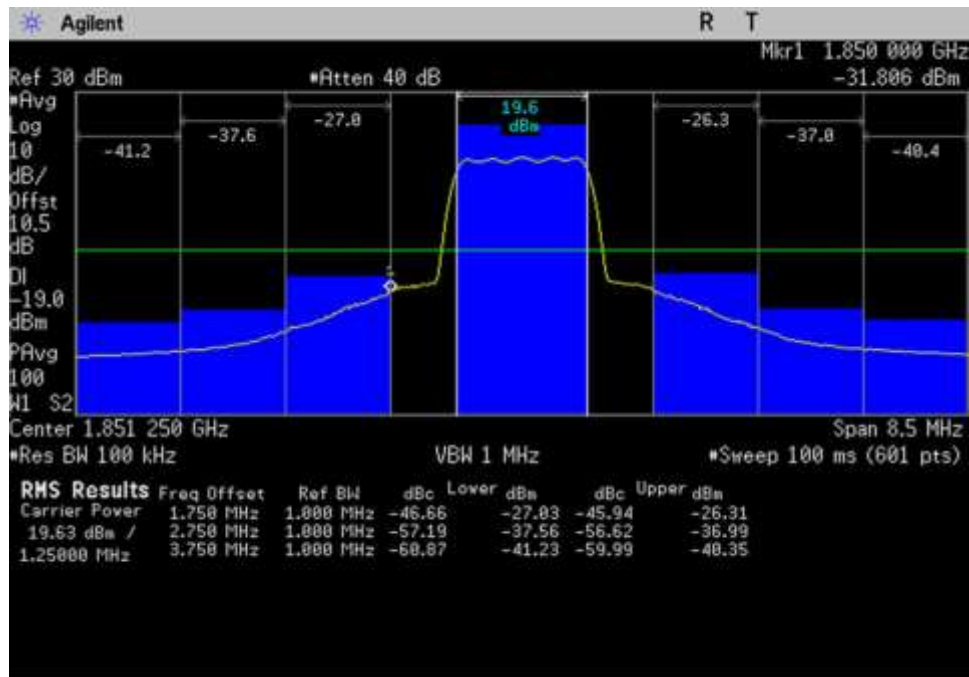
UL\_824-849\_CDMA\_846.1-850.1MHz



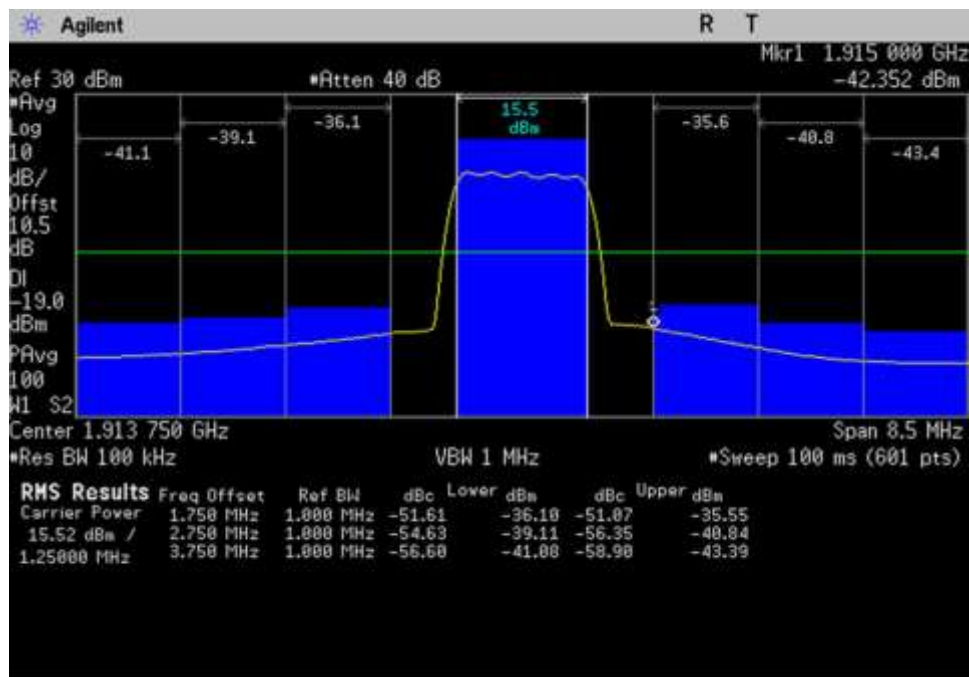
UL\_1710-1755\_CDMA\_ 1707- 1715.5MHz



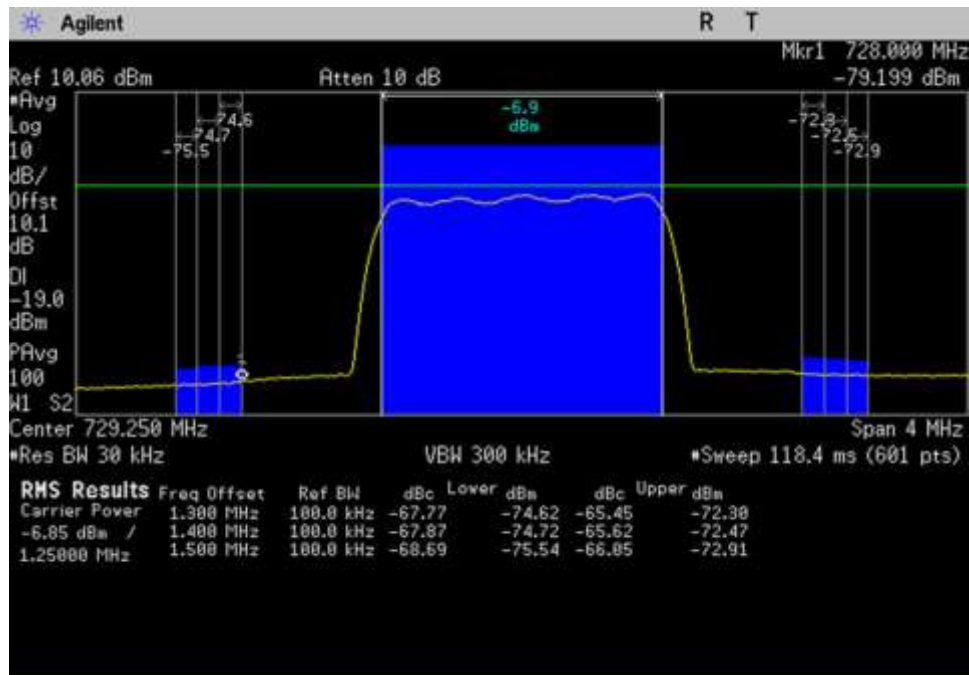
UL\_1710-1755\_CDMA\_ 1749.5- 1758MHz



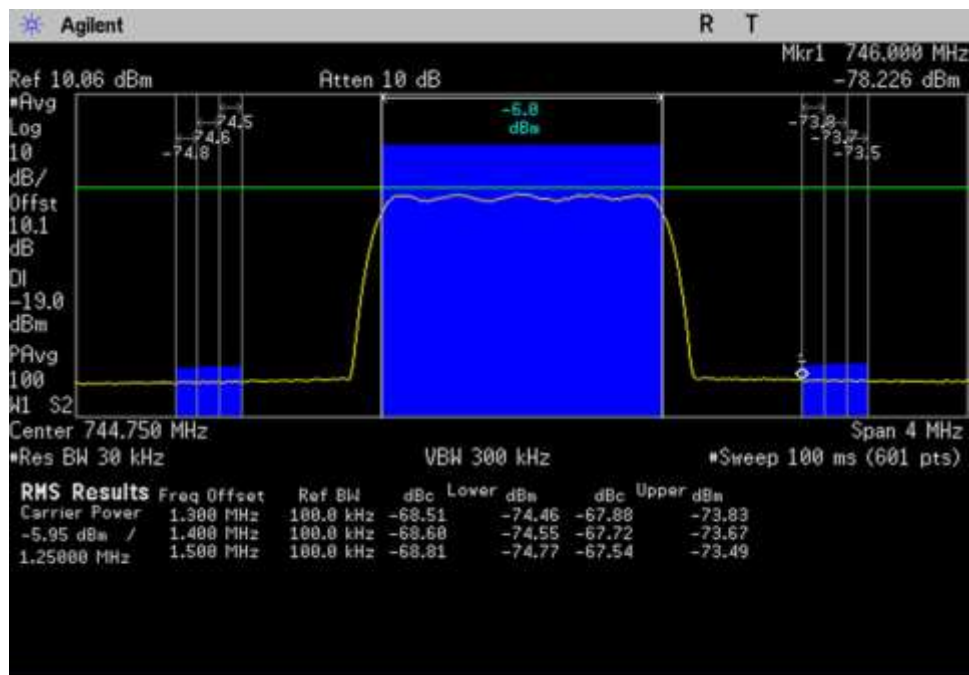
UL\_1850-1915\_CDMA\_ 1847- 1855.5MHz



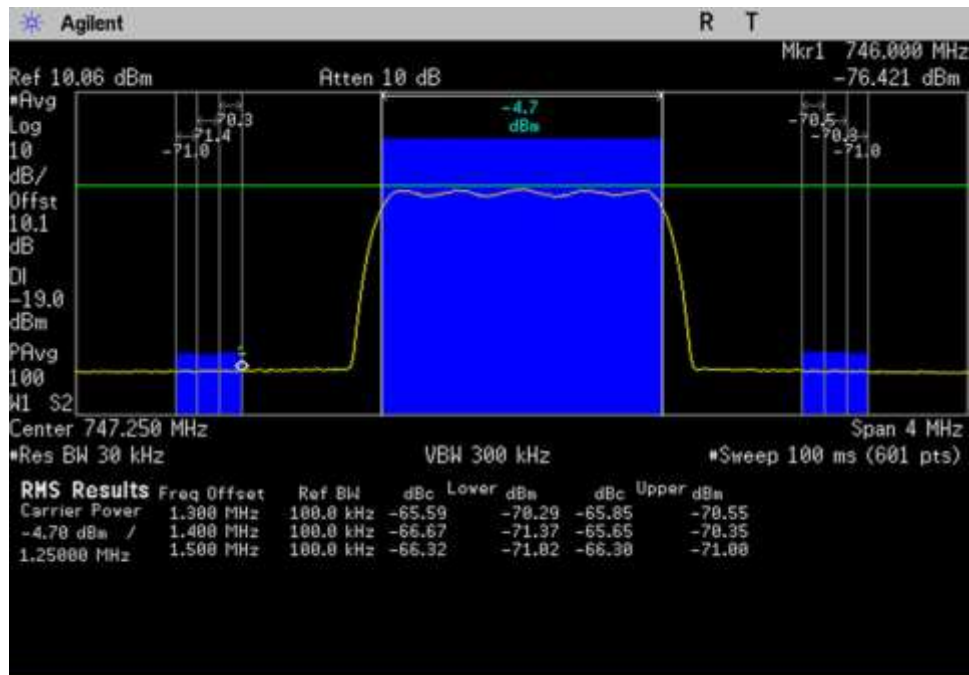
UL\_1850-1915\_CDMA\_ 1909.5- 1918MHz



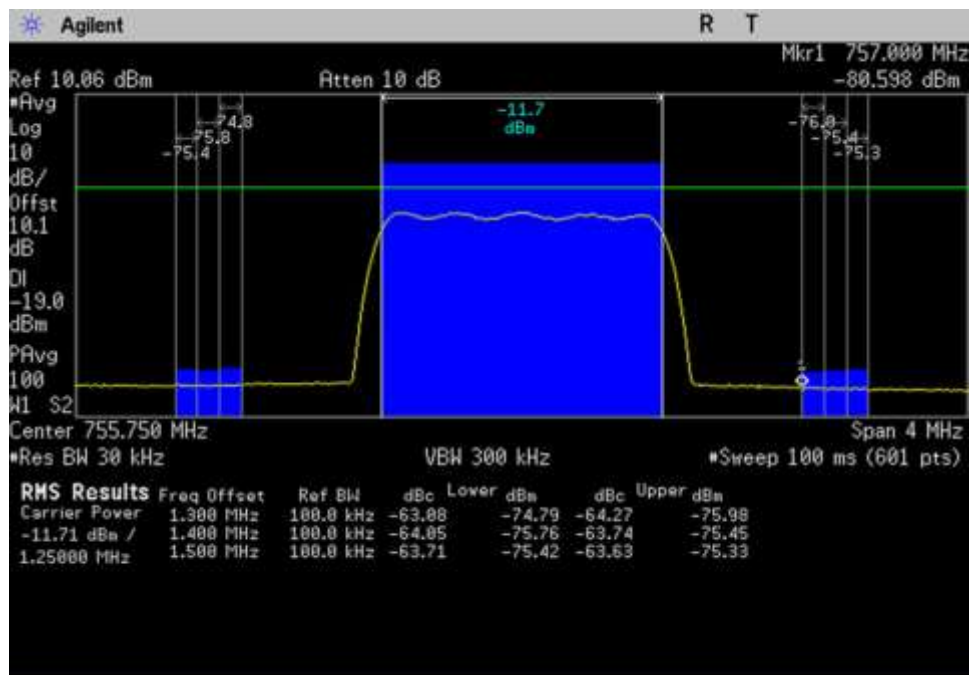
DL\_728-746\_CDMA\_727.25-731.25MHz



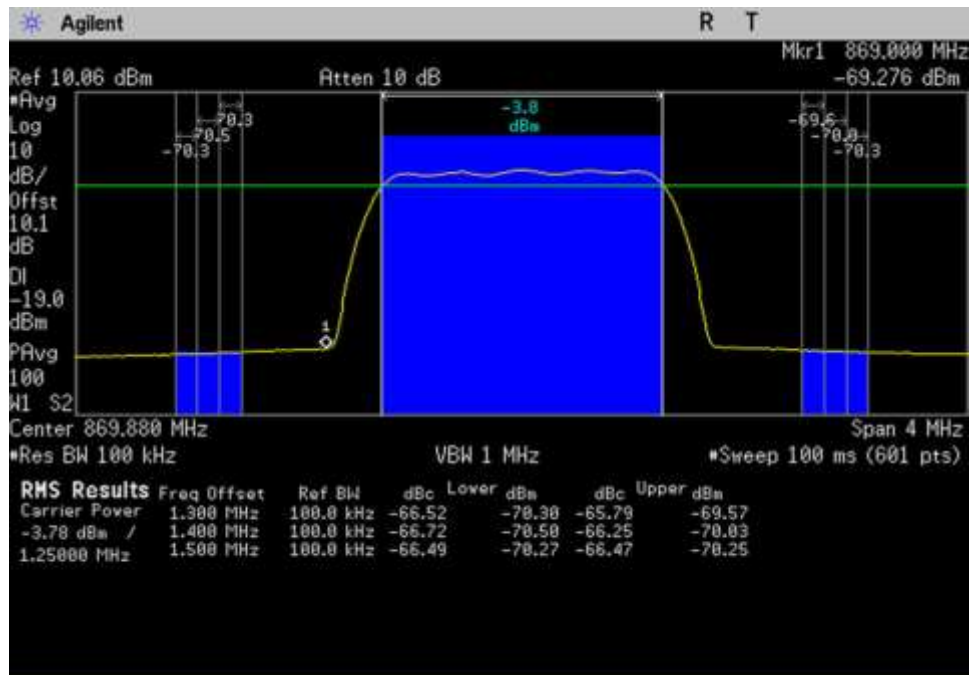
DL\_728-746\_CDMA\_742.75-746.75MHz



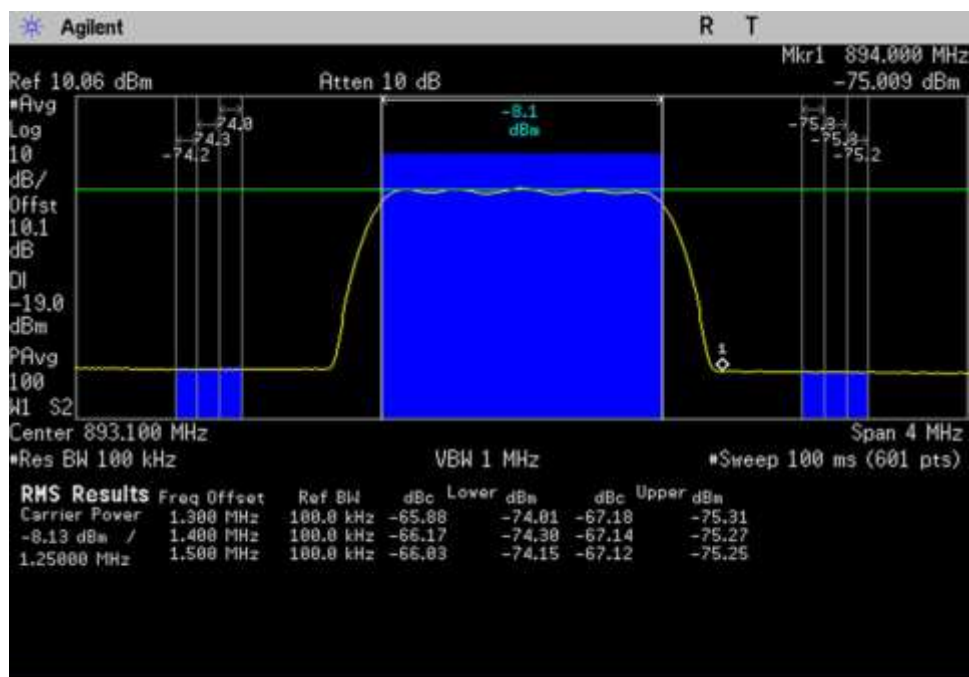
DL\_746-757\_CDMA\_745.25-749.25MHz



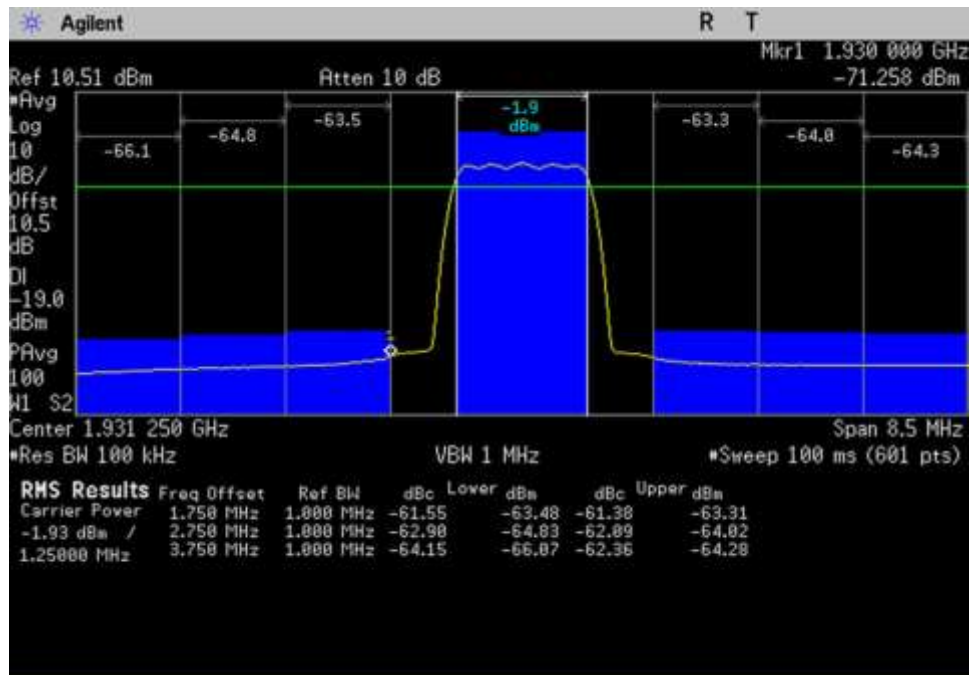
DL\_746-757\_CDMA\_753.75-757.75MHz



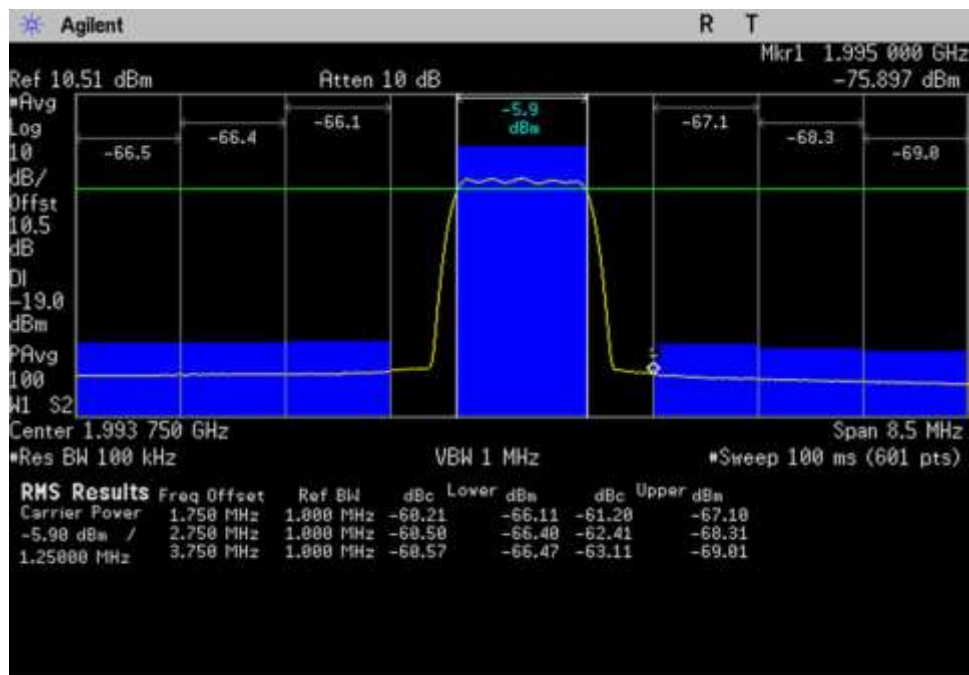
DL\_869-894\_CDMA\_867.88-871.88MHz



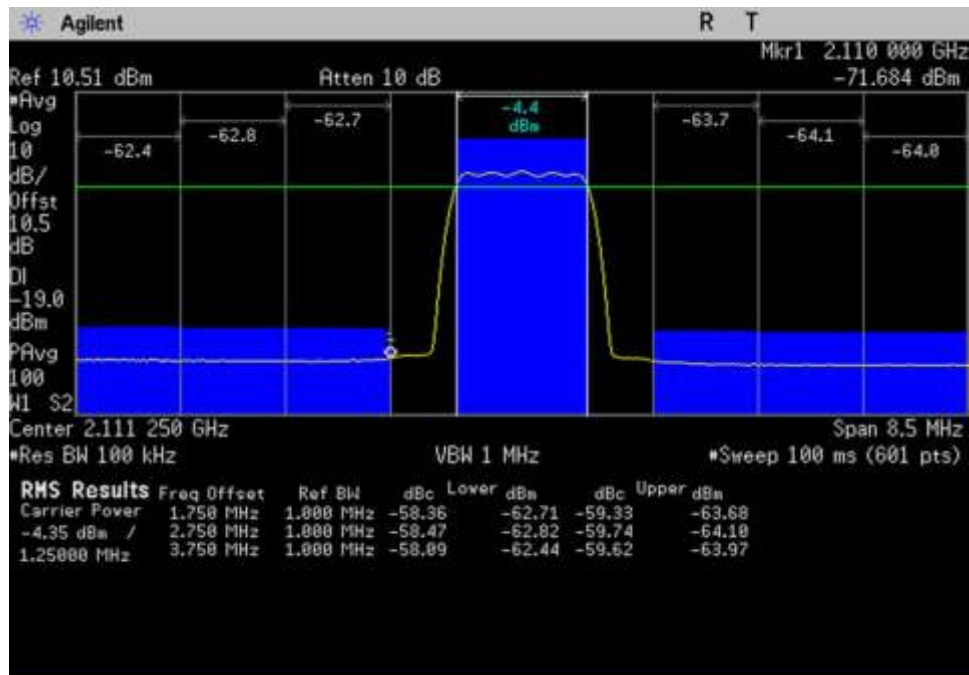
DL\_869-894\_CDMA\_891.1-895.1MHz



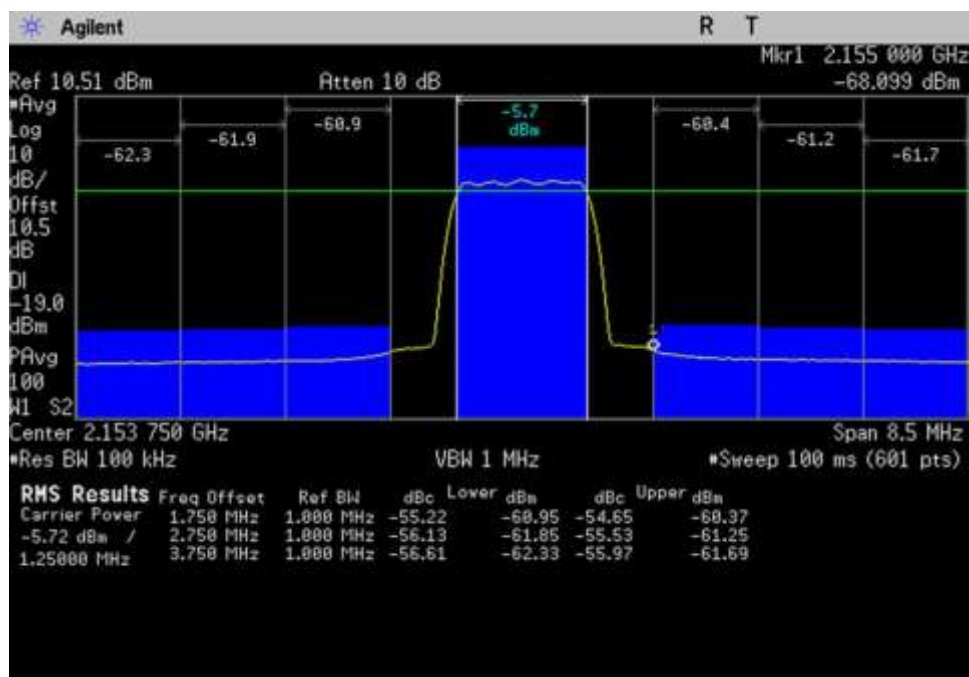
DL\_1930-1995\_CDMA\_1927-1935.5MHz



DL\_1930-1995\_CDMA\_1989.5-1998MHz

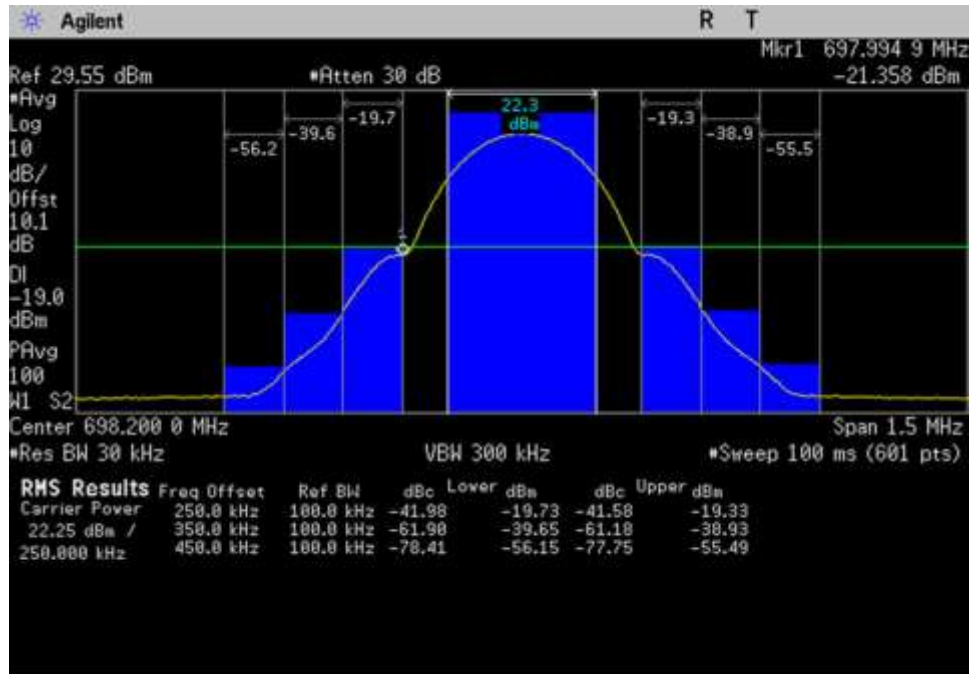


DL\_2110-2155\_CDMA\_ 2107- 2115.5MHz

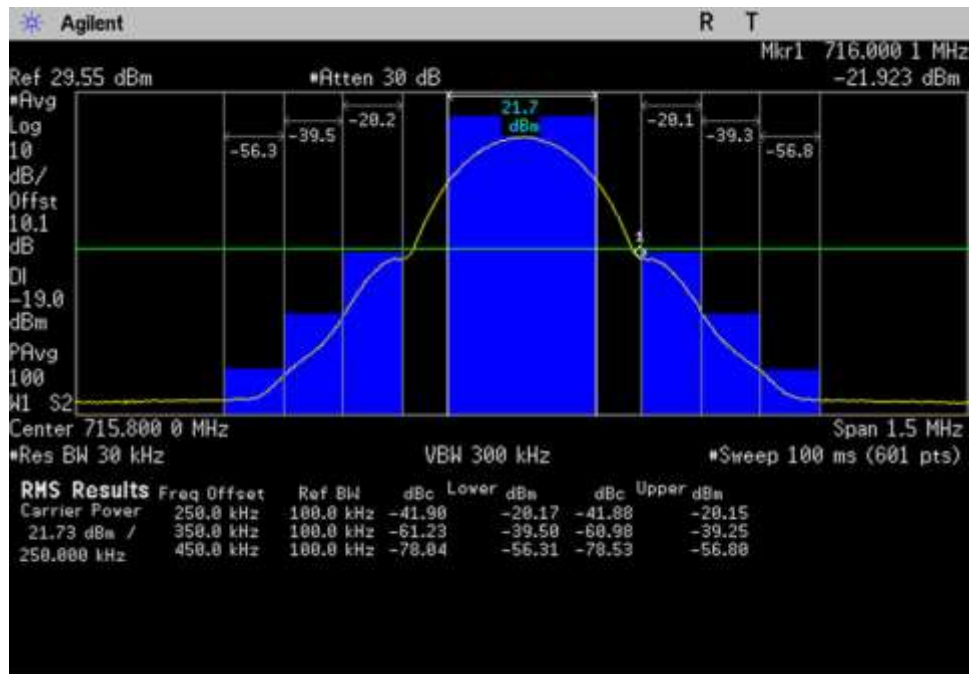


DL\_2110-2155\_CDMA\_ 2149.5- 2158MHz

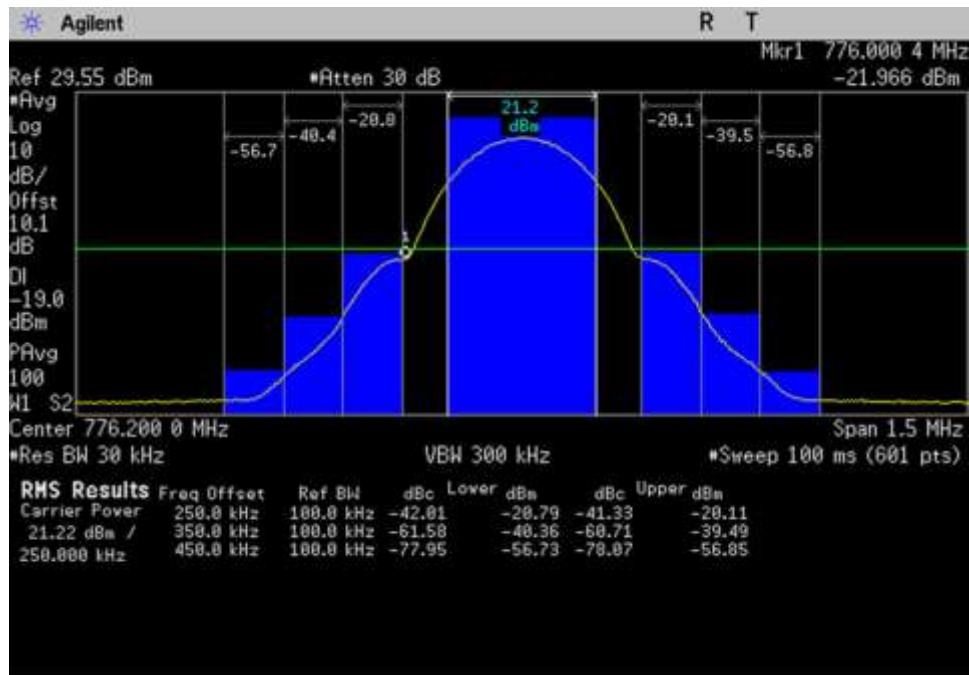
## GSM



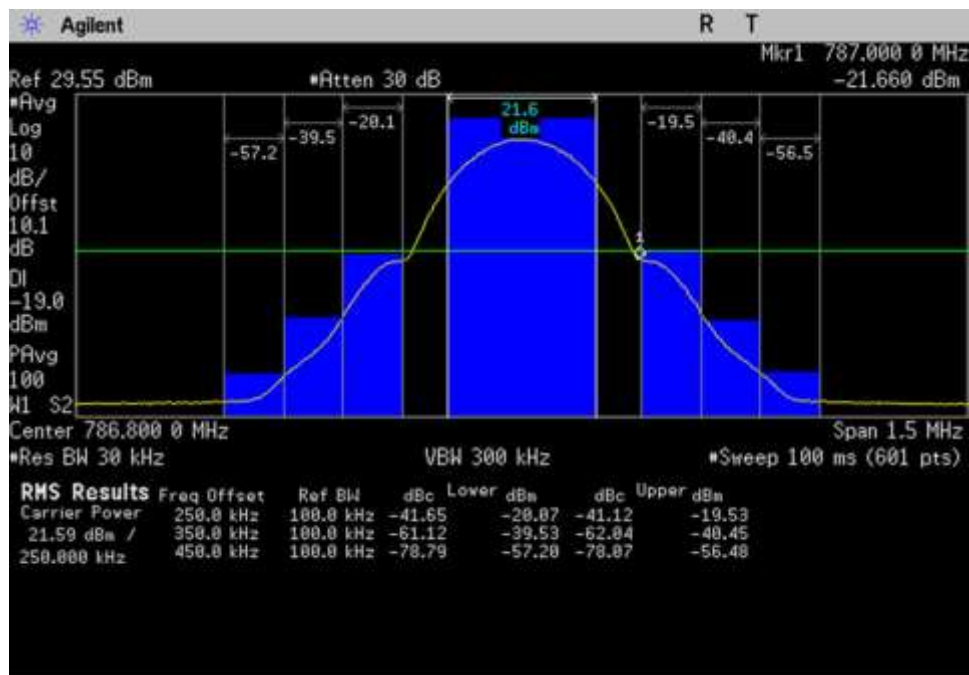
UL\_698-716\_GSM\_697.45-698.95MHz



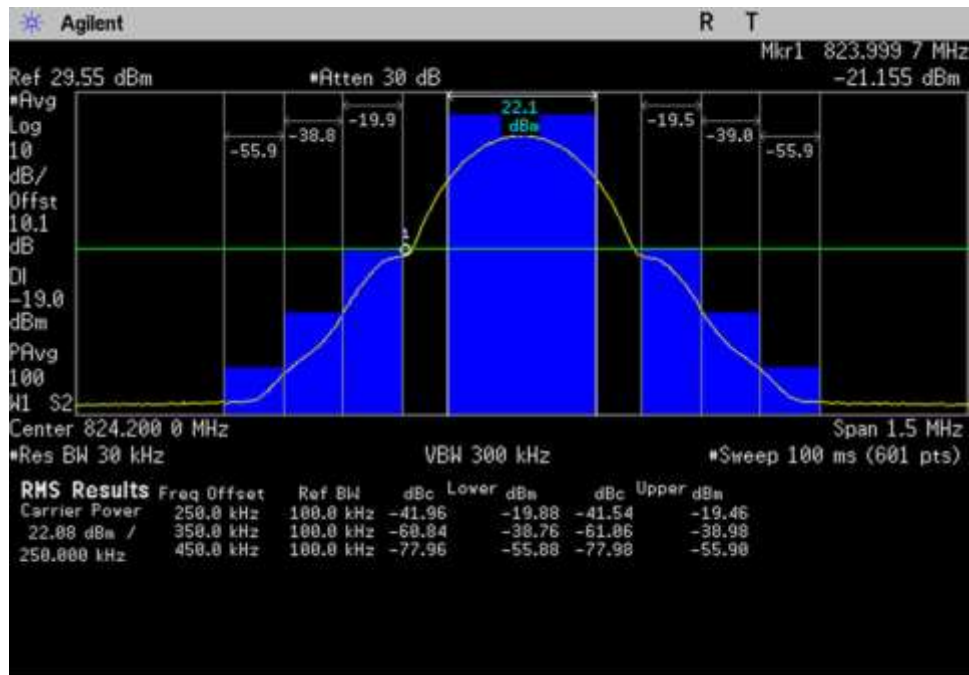
UL\_698-716\_GSM\_715.05-716.55MHz



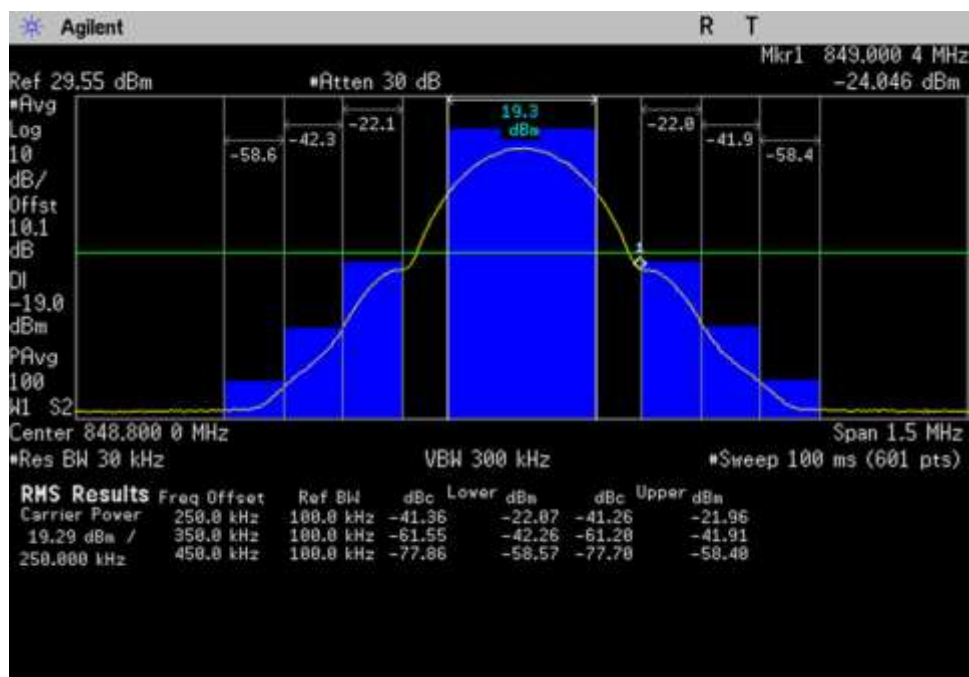
UL\_776-787\_GSM\_ 775.45- 776.95MHz



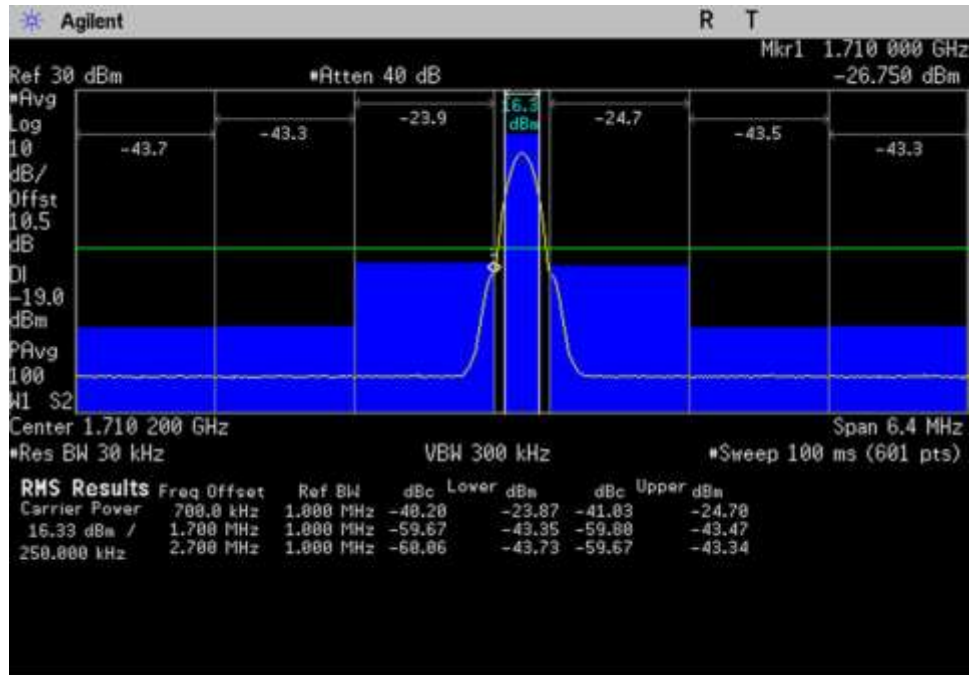
UL\_776-787\_GSM\_ 786.05- 787.55MHz



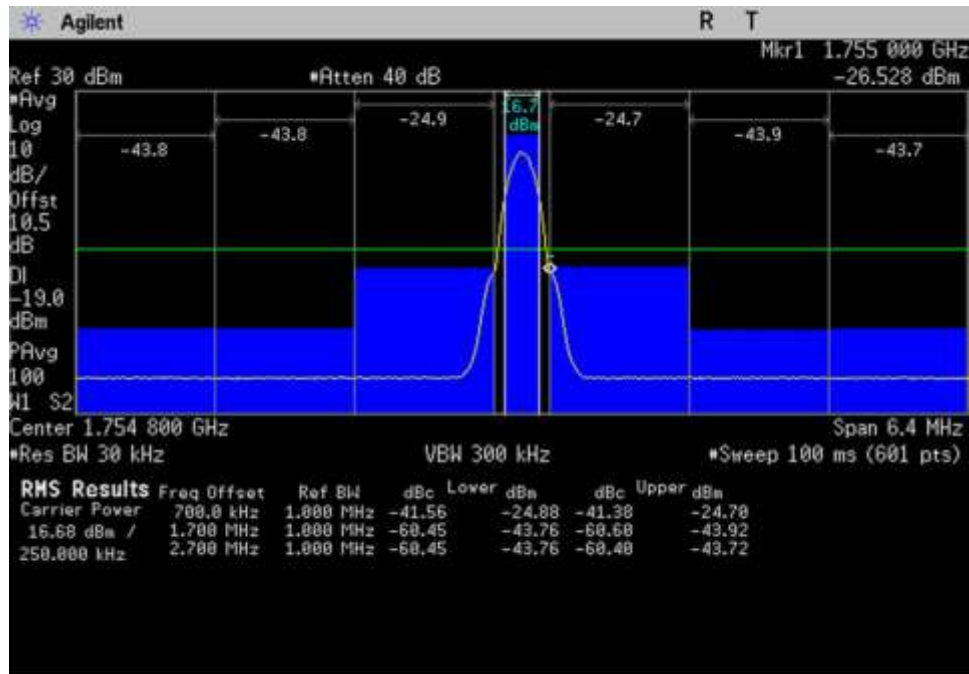
UL\_824-849\_GSM\_ 823.45- 824.95MHz



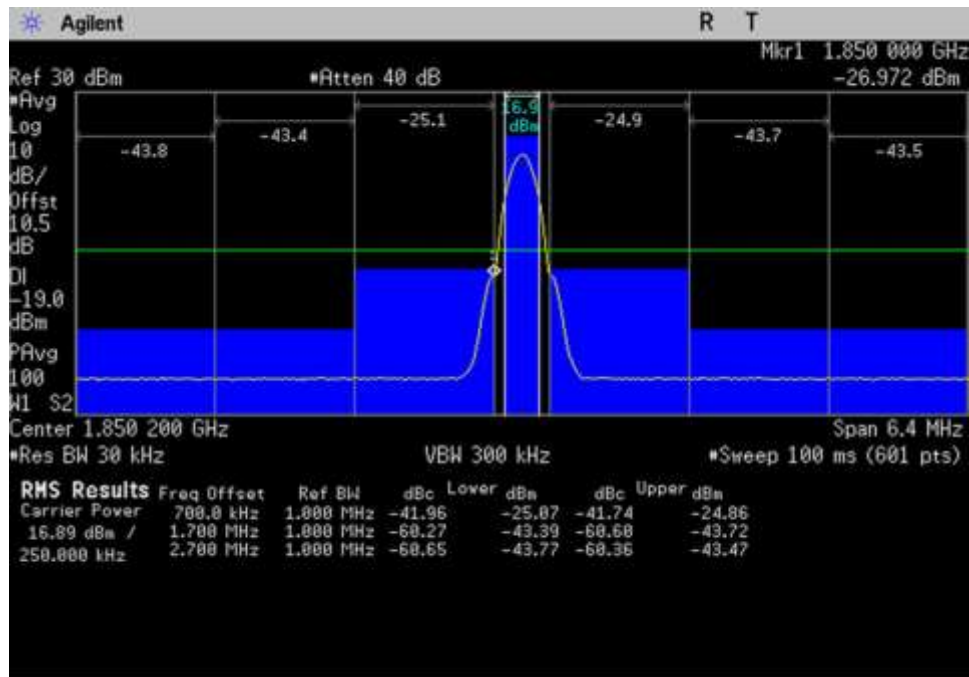
UL\_824-849\_GSM\_ 848.05- 849.55MHz



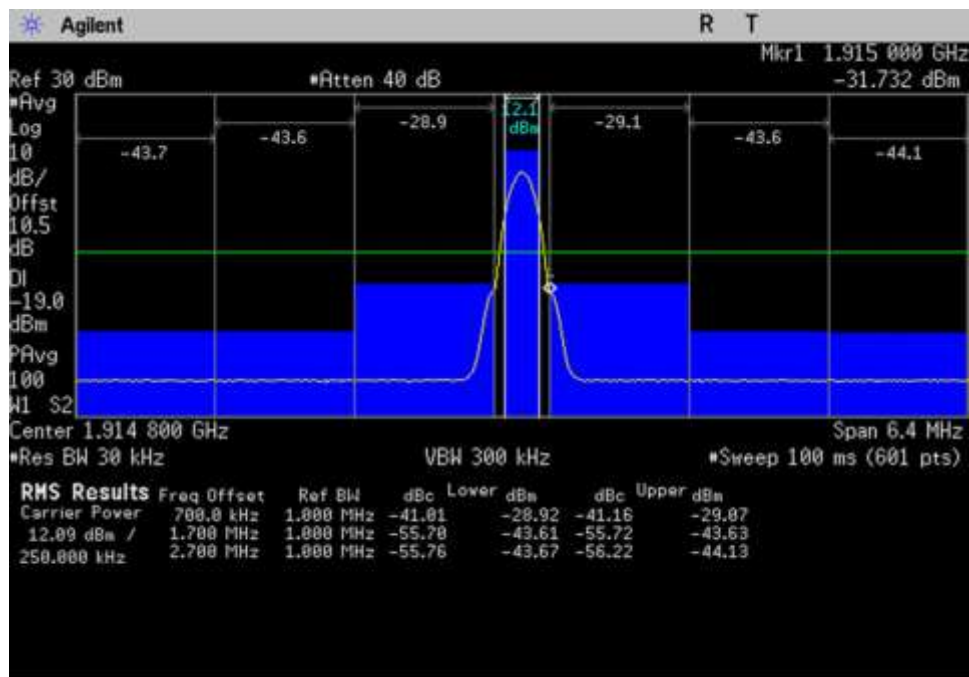
UL\_1710-1755\_GSM\_1707-1713.4MHz



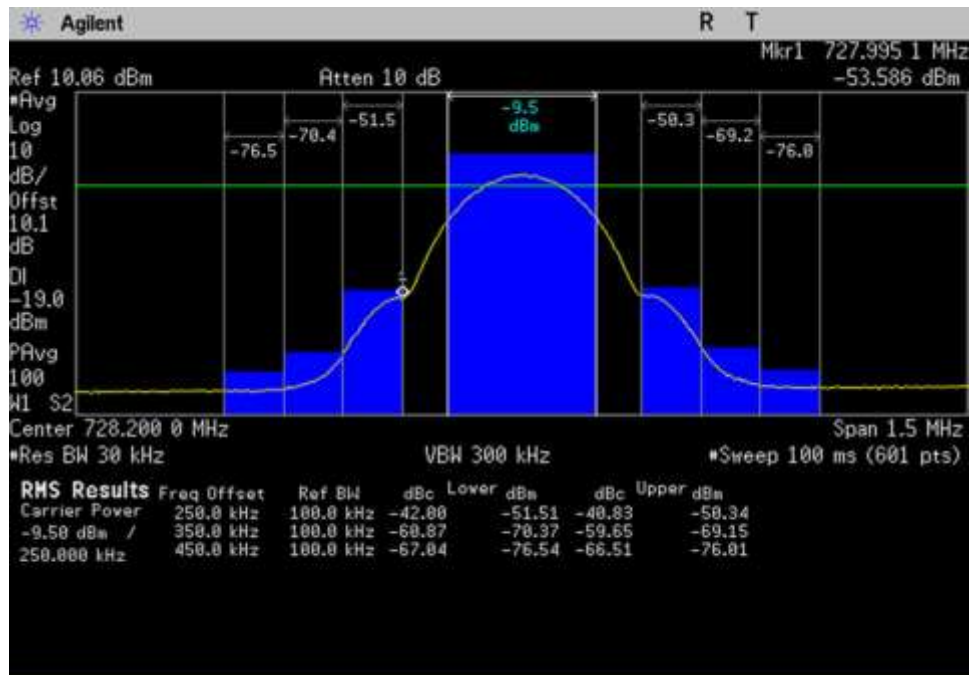
UL\_1710-1755\_GSM\_1751.6-1758MHz



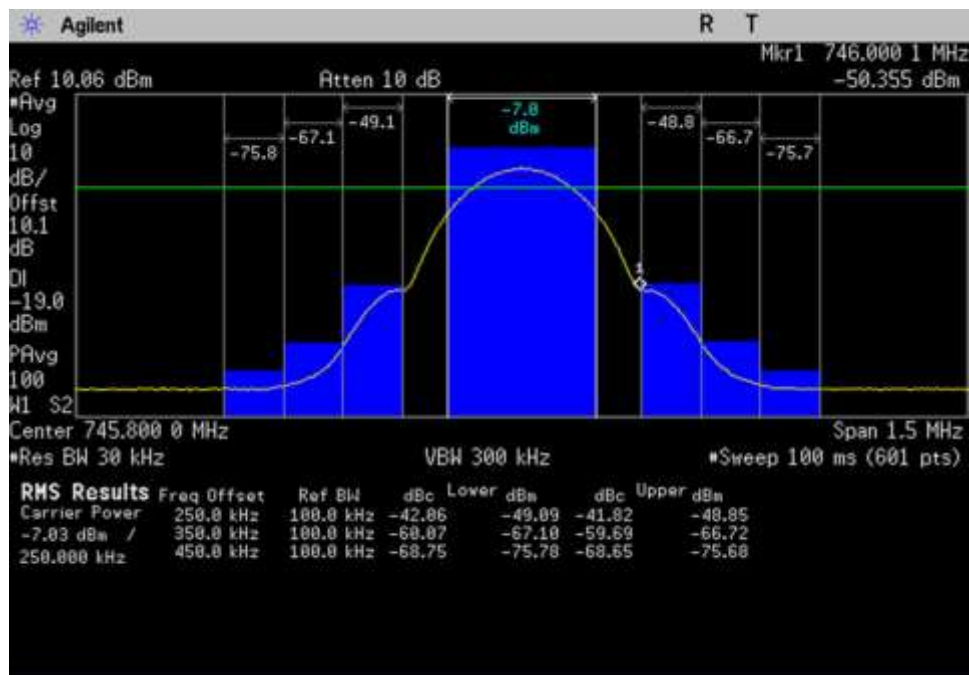
UL\_1850-1915\_GSM\_1847-1853.4MHz



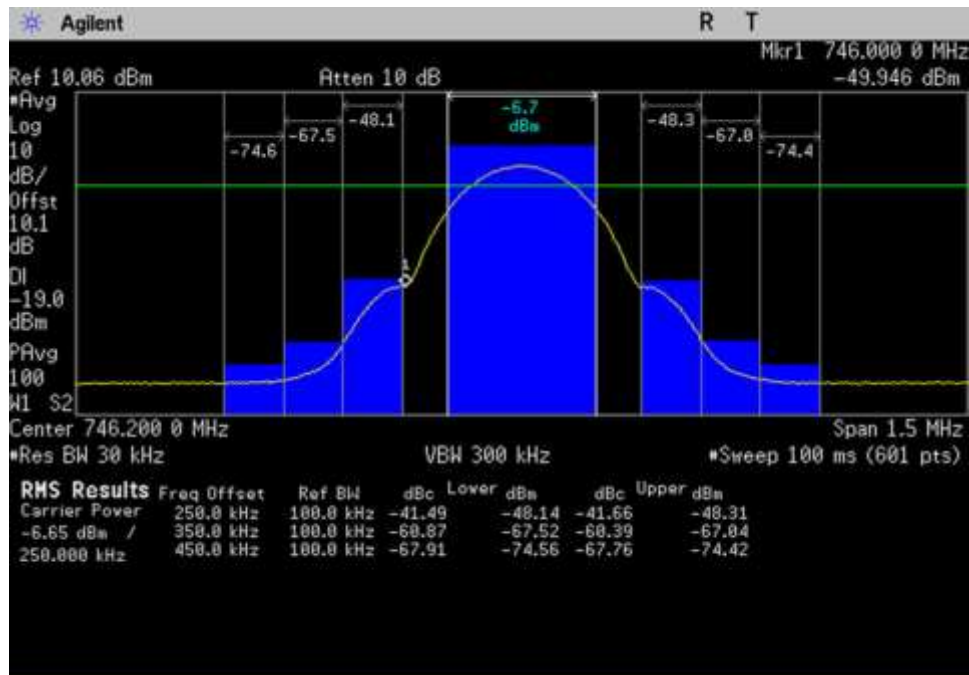
UL\_1850-1915\_GSM\_1911.6-1918MHz



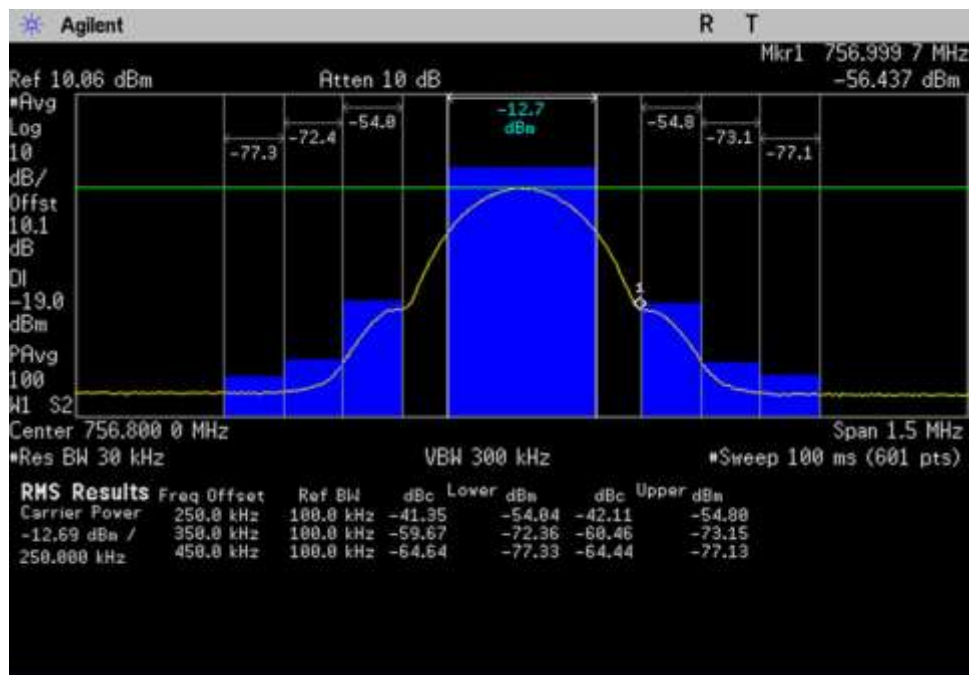
DL\_728-746\_GSM\_ 727.45- 728.95MHz



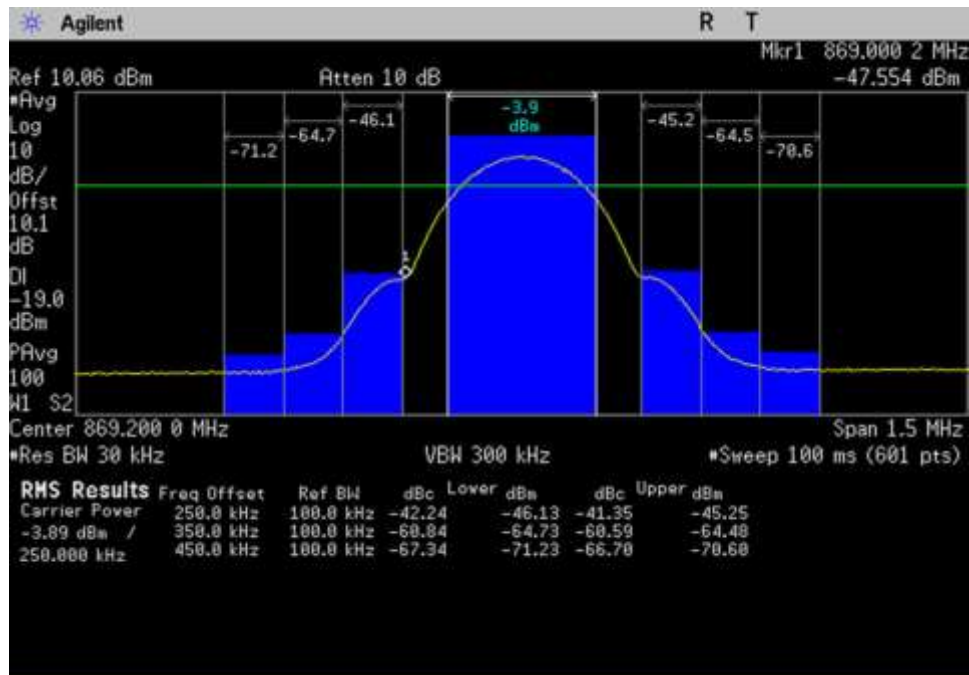
DL\_728-746\_GSM\_ 745.05- 746.55MHz



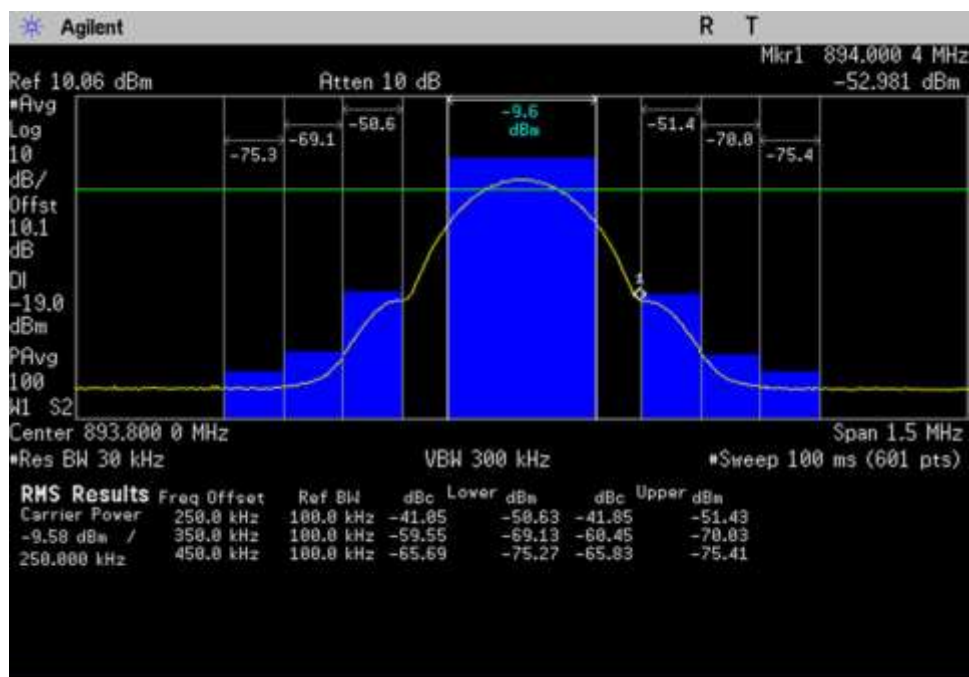
DL\_746-757\_GSM\_ 745.45- 746.95MHz



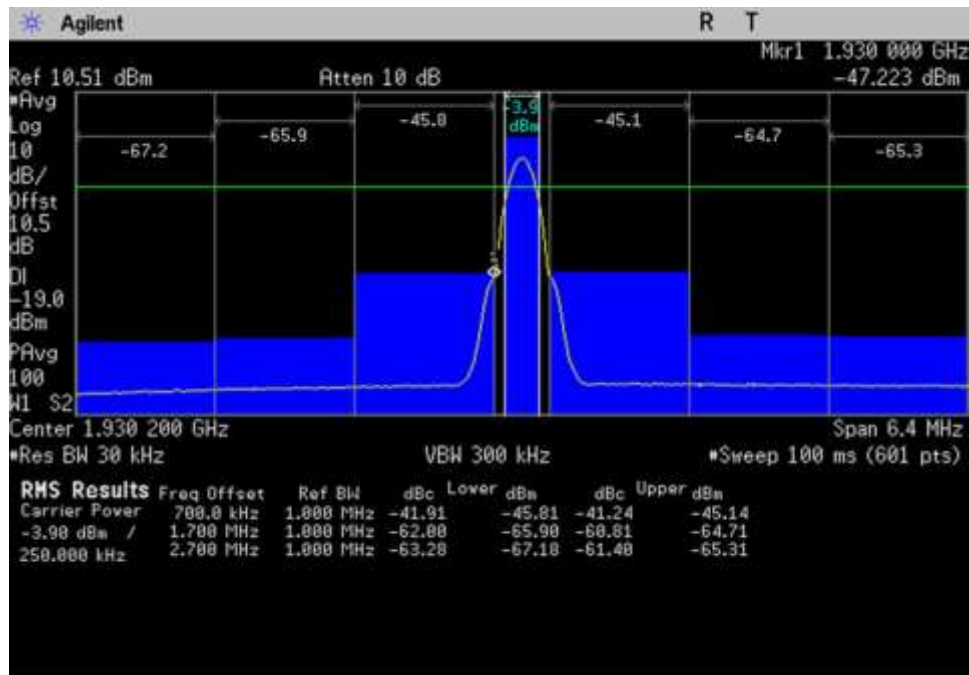
DL\_746-757\_GSM\_ 756.05- 757.55MHz



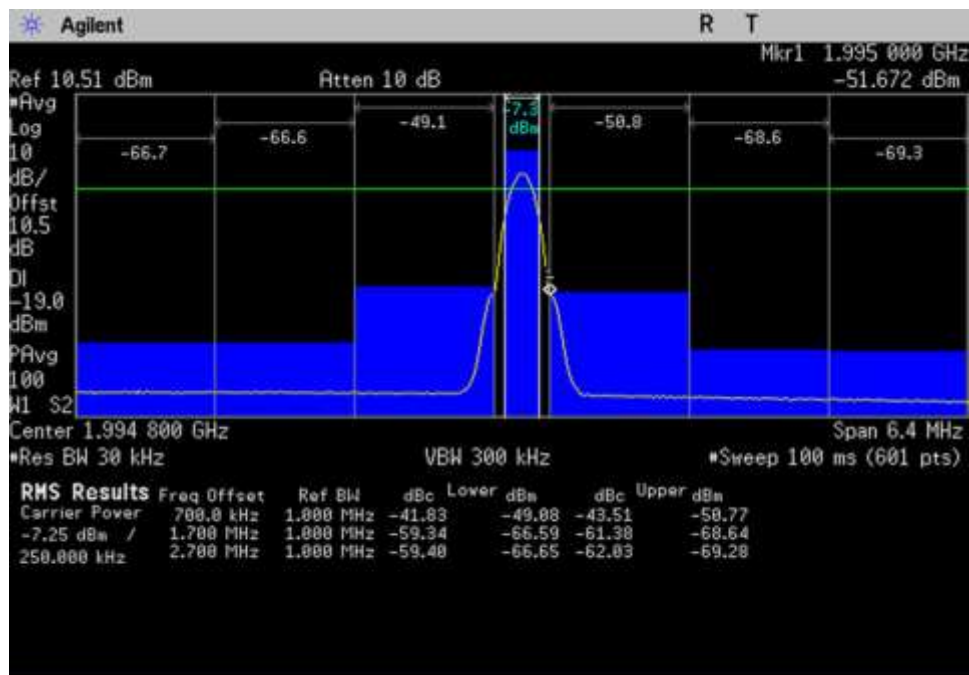
DL\_869-894\_GSM\_ 868.45- 869.95MHz



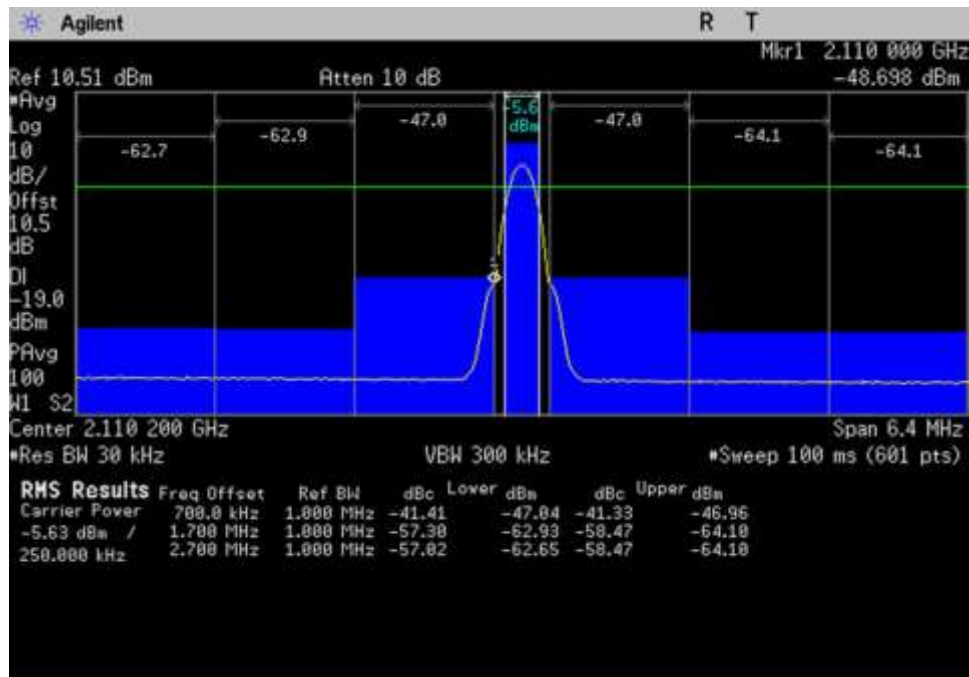
DL\_869-894\_GSM\_ 893.05- 894.55MHz



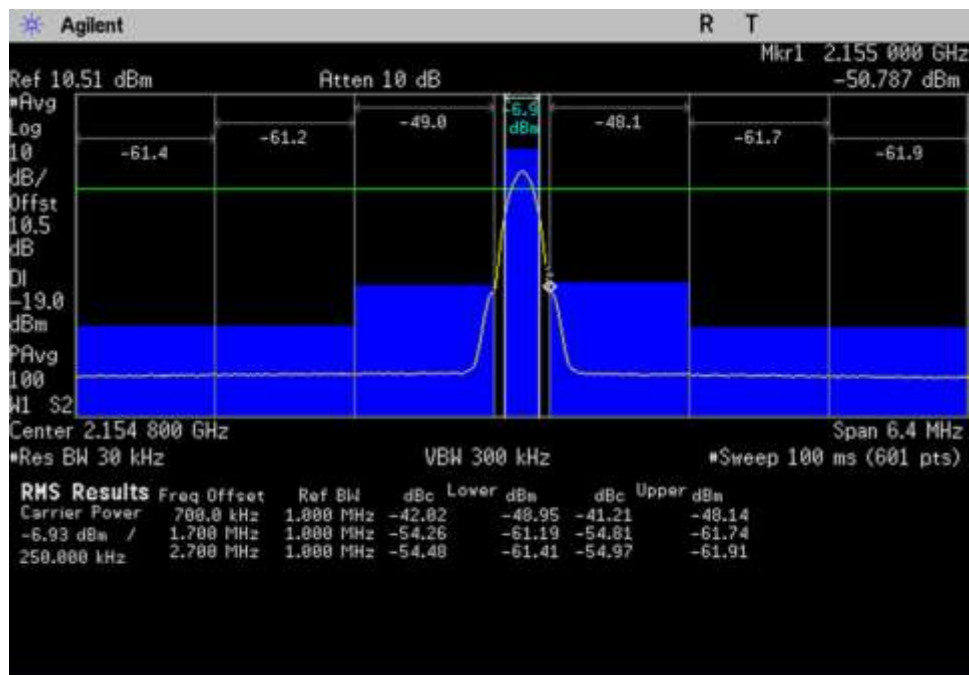
DL\_1930-1995\_GSM\_ 1927- 1933.4MHz



DL\_1930-1995\_GSM\_ 1991.6- 1998MHz

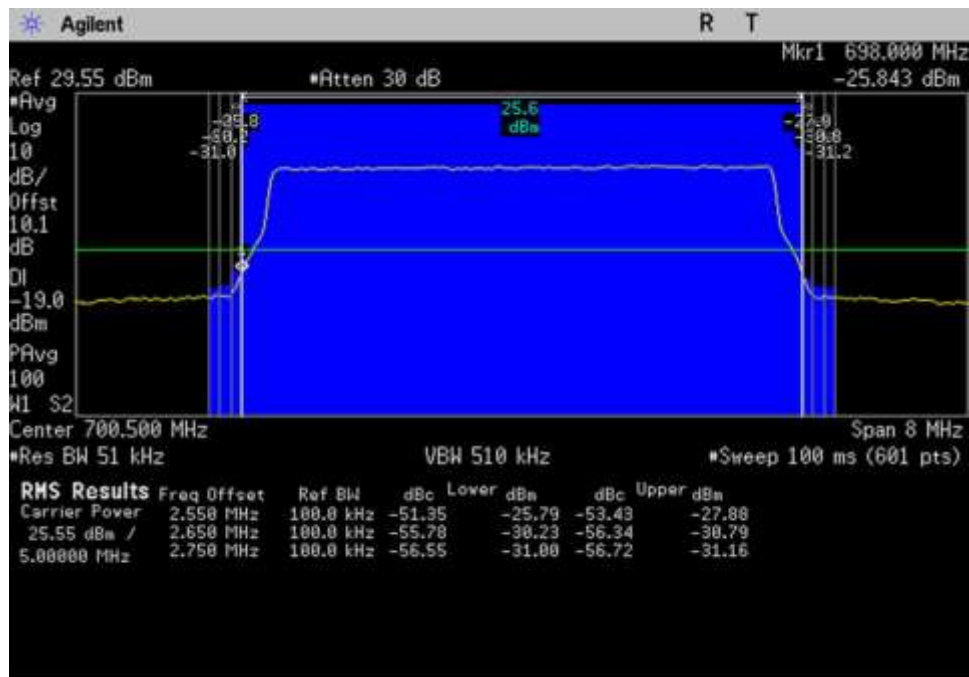


DL\_2110-2155\_GSM\_2107-2113.4MHz

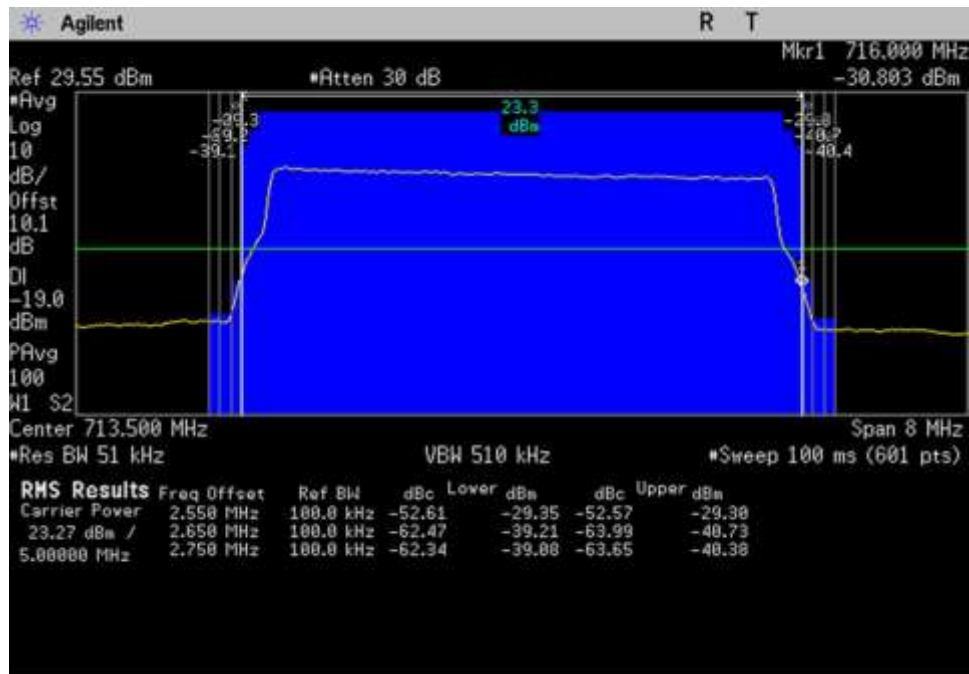


DL\_2110-2155\_GSM\_2151.6-2158MHz

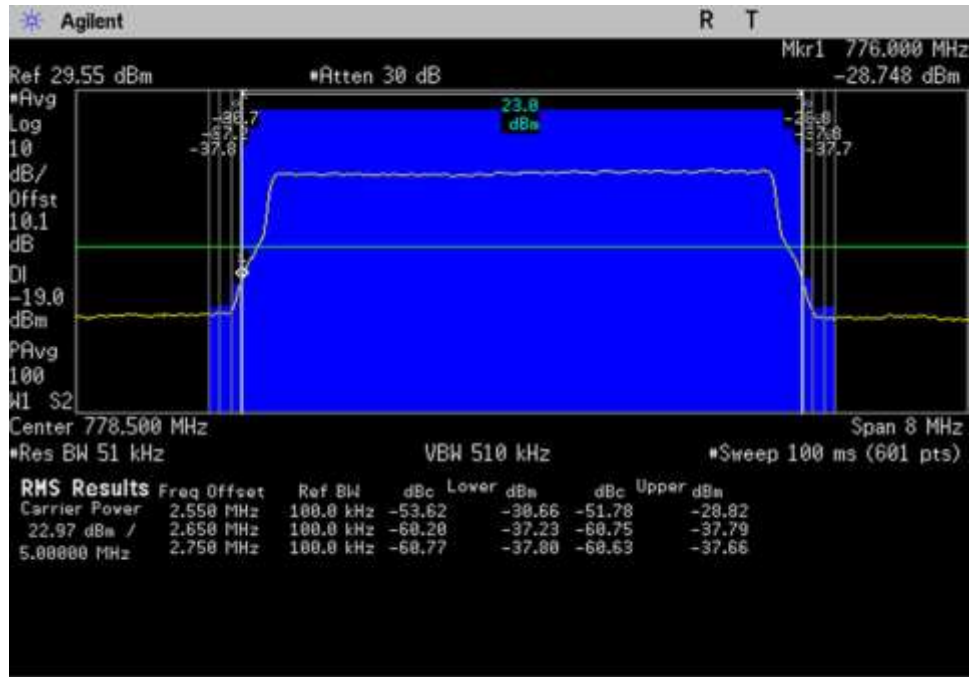
# LTE



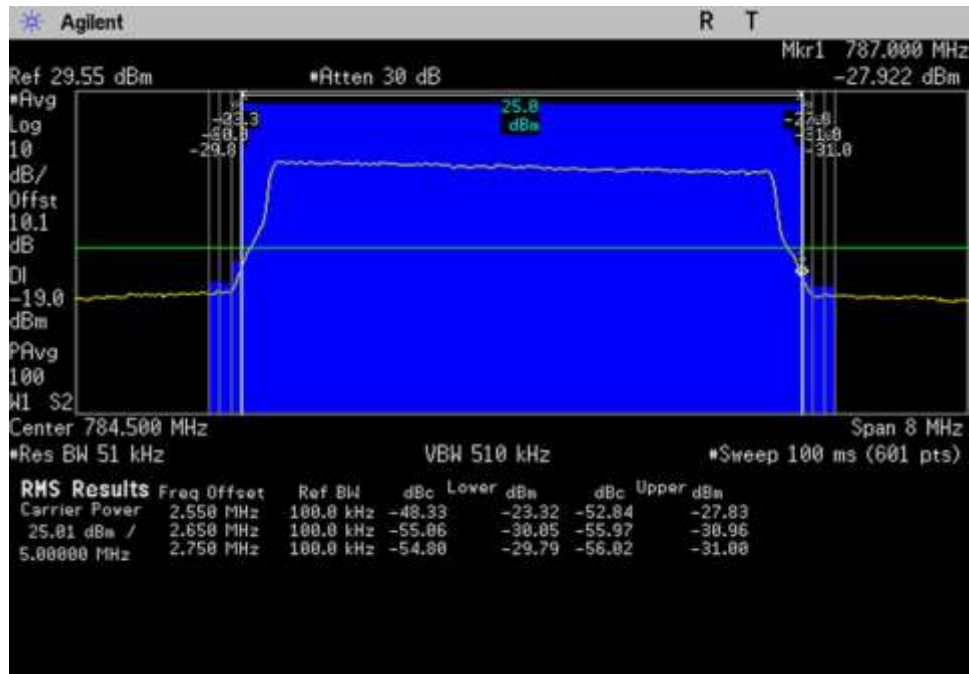
UL\_698-716\_LTE\_696.5- 704.5MHz



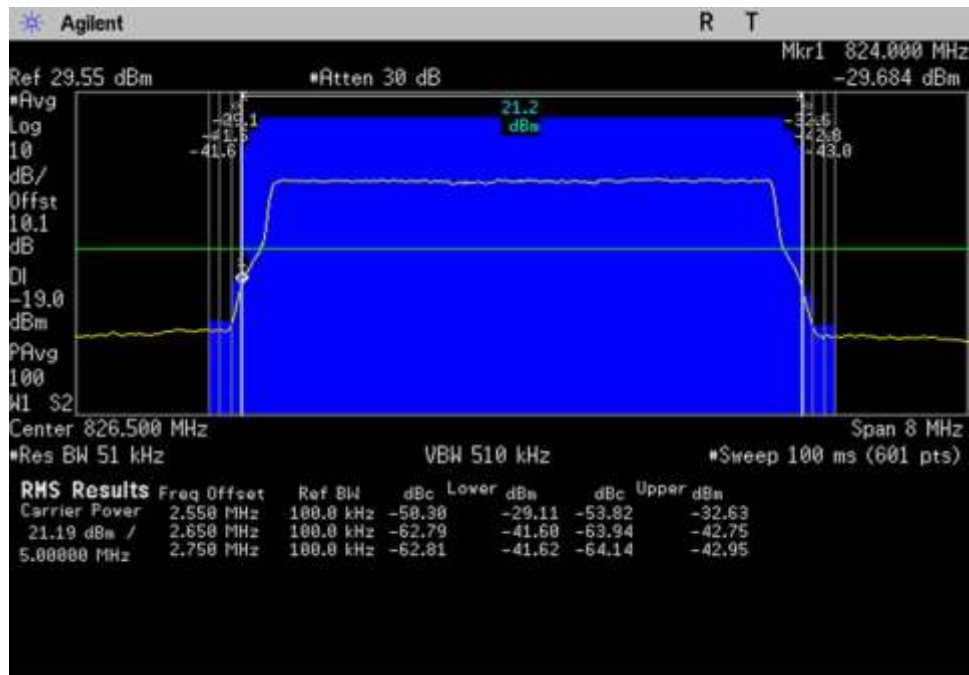
UL\_698-716\_LTE\_709.5- 717.5MHz



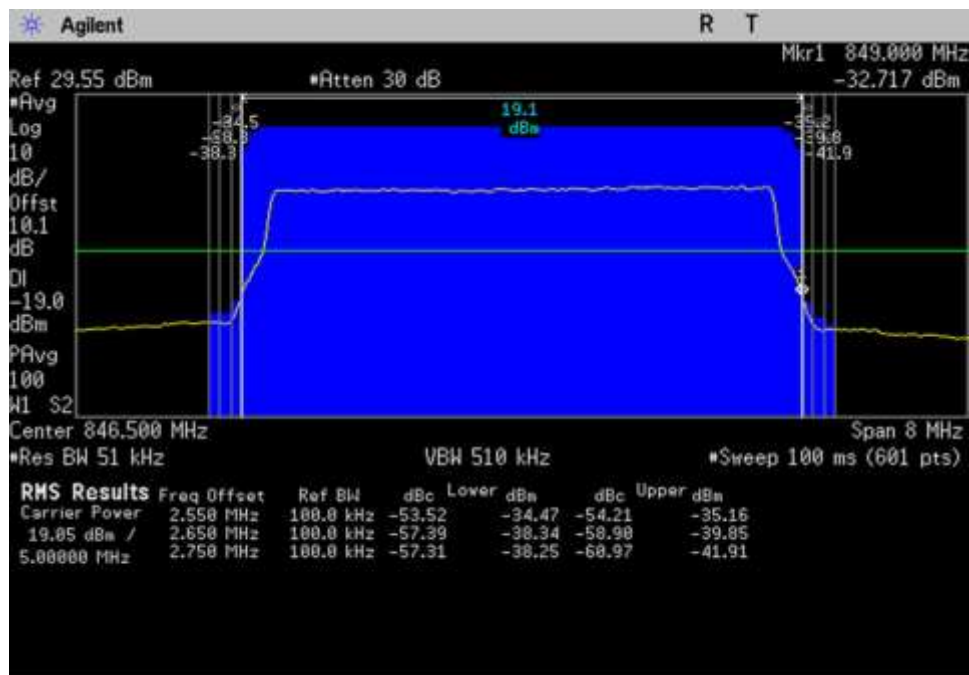
UL\_776-787\_LTE\_774.5-782.5MHz



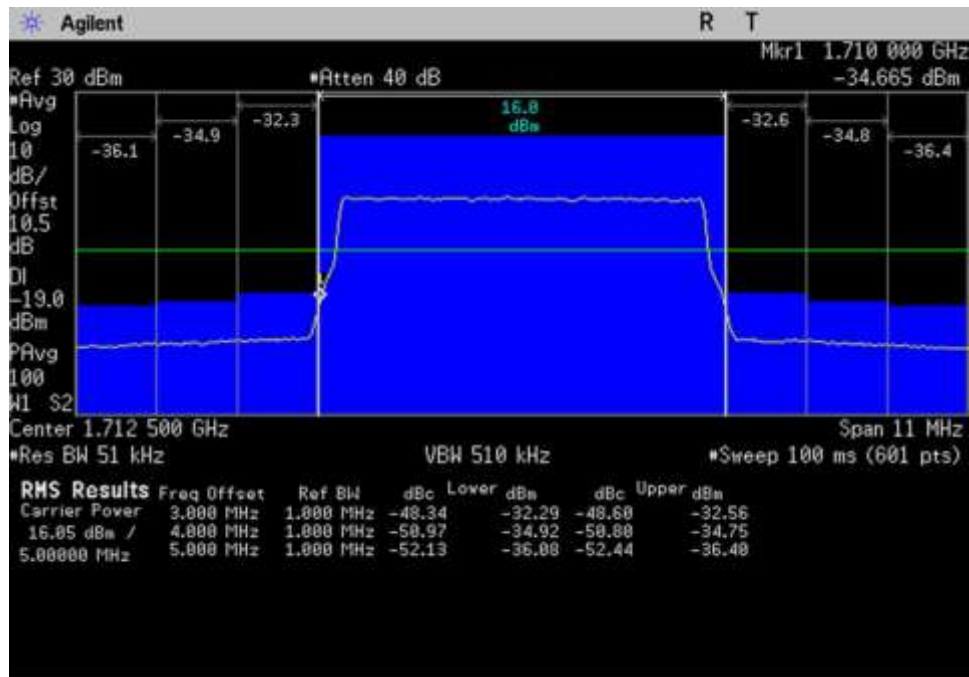
UL\_776-787\_LTE\_780.5-788.5MHz



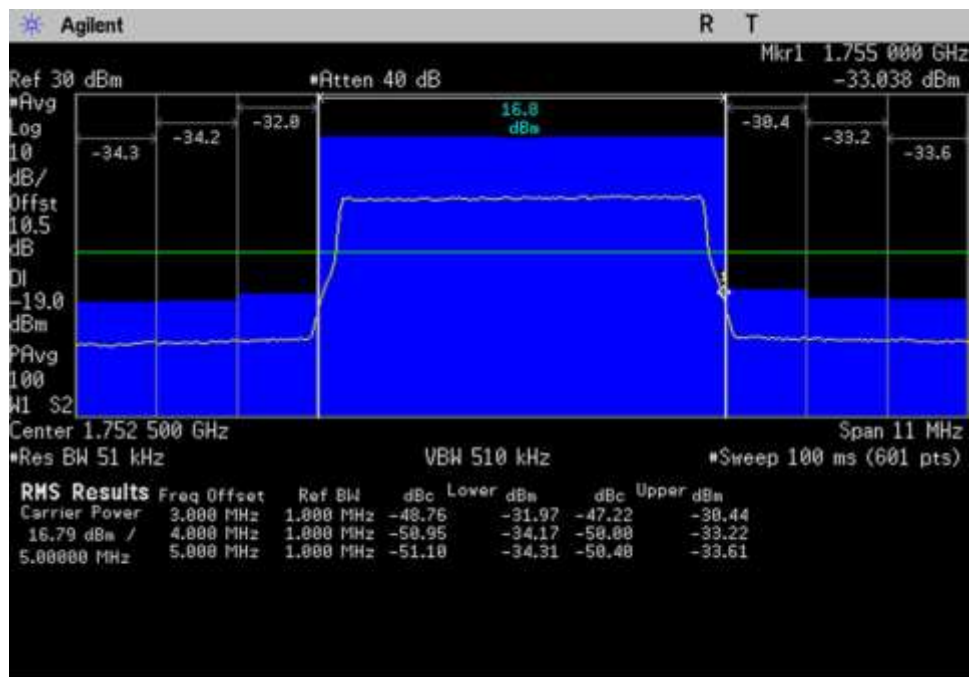
UL\_824-849\_LTE\_822.5-830.5MHz



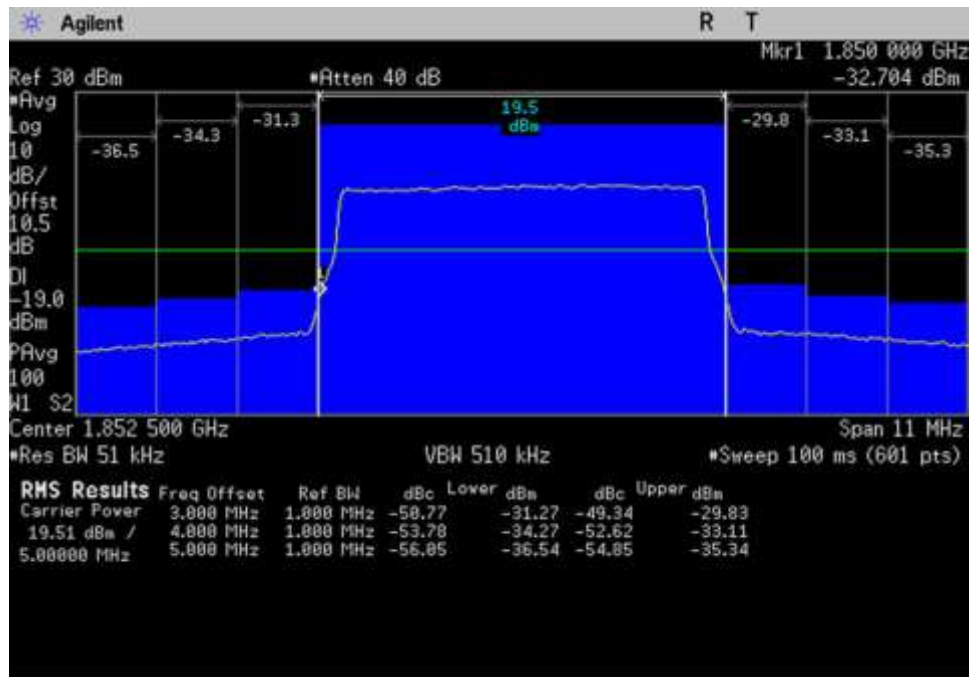
UL\_824-849\_LTE\_842.5-850.5MHz



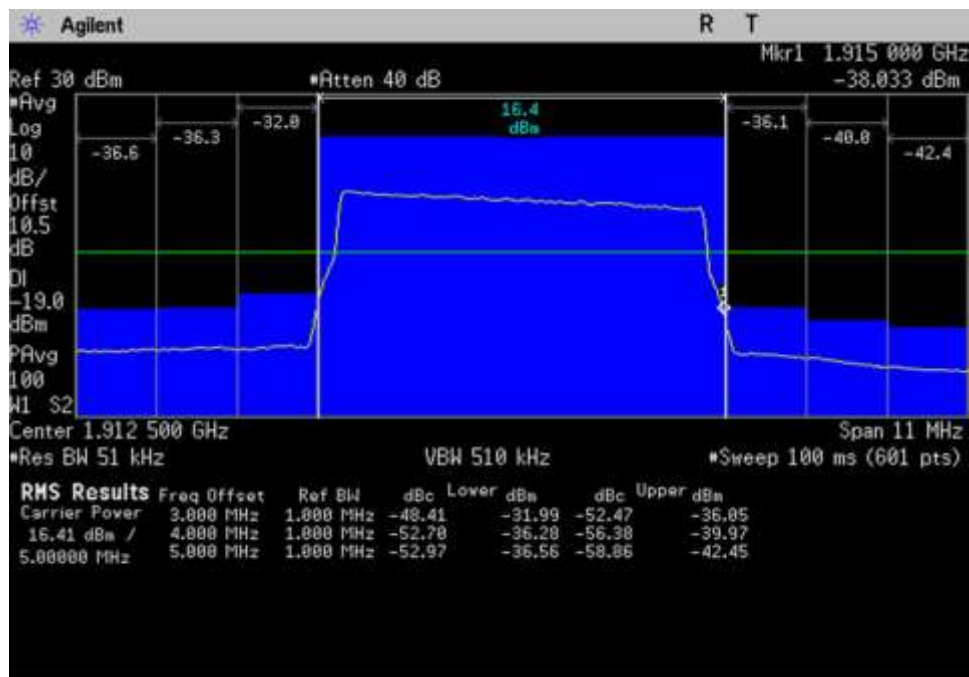
UL\_1710-1755\_LTE\_1707-1718MHz



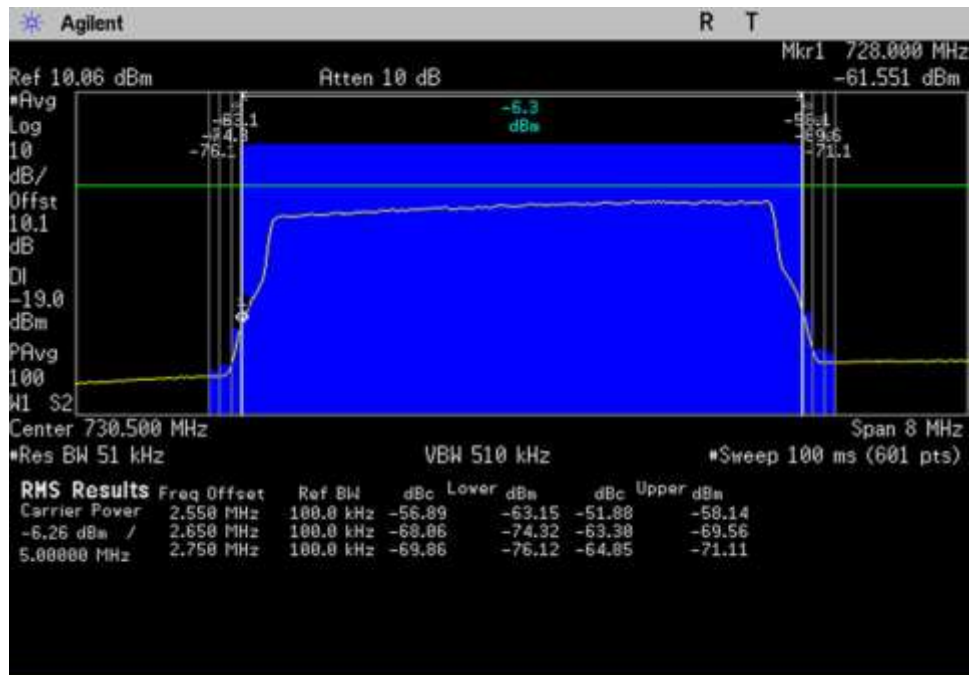
UL\_1710-1755\_LTE\_1747-1758MHz



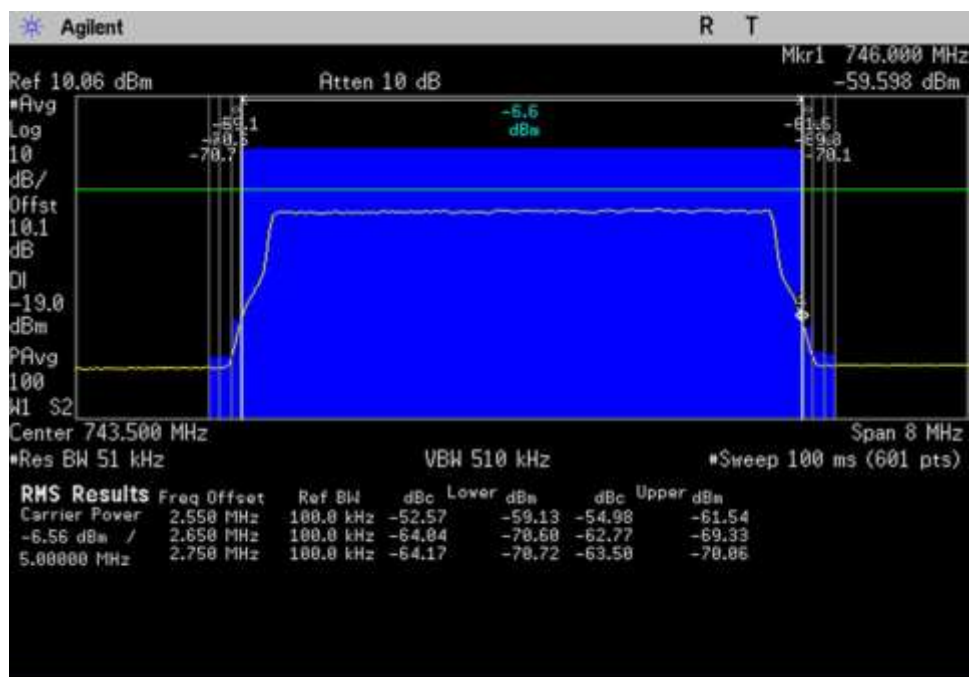
UL\_1850-1915\_LTE\_1847-1858MHz



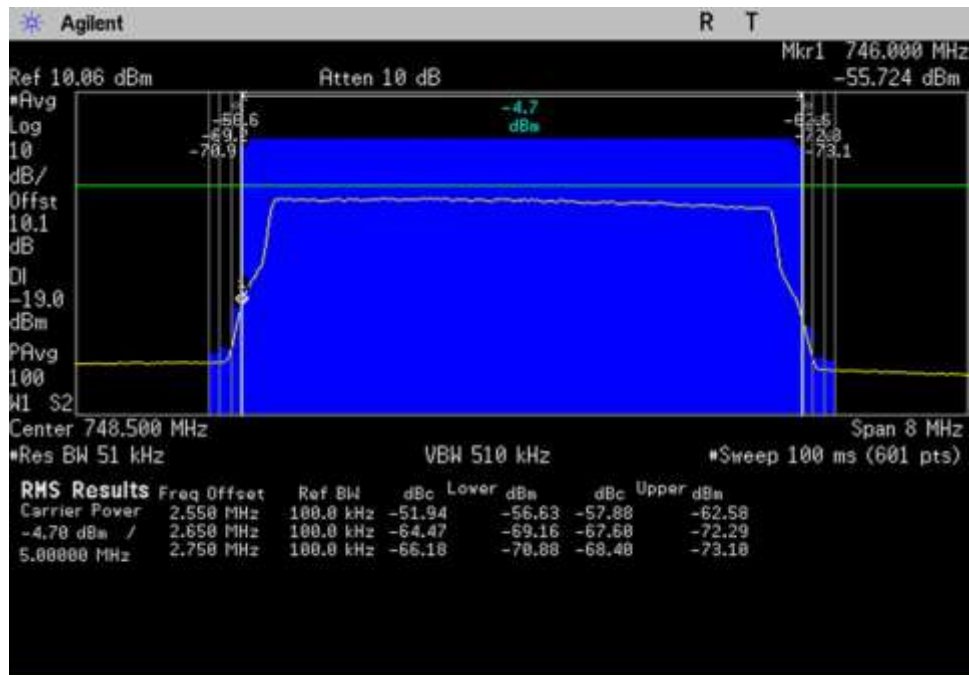
UL\_1850-1915\_LTE\_1907-1918MHz



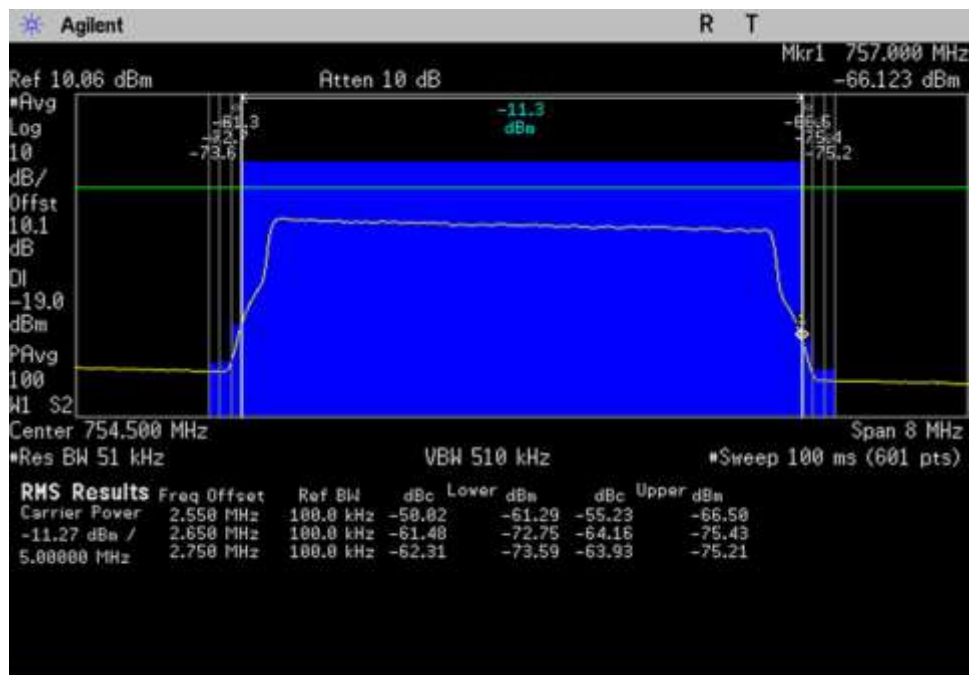
DL\_728-746\_LTE\_ 726.5- 734.5MHz



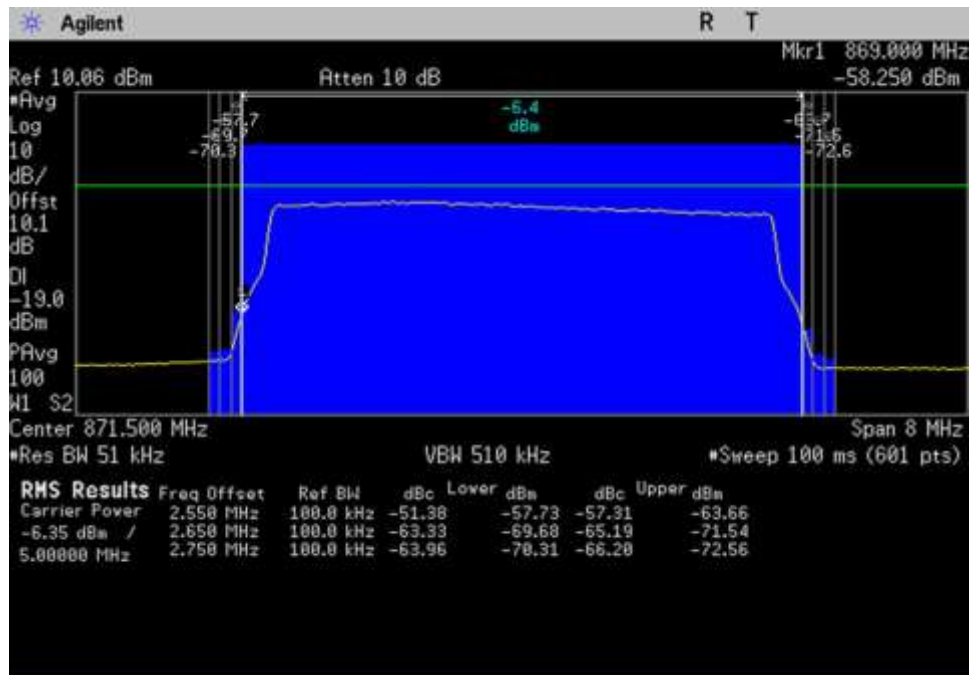
DL\_728-746\_LTE\_ 739.5- 747.5MHz



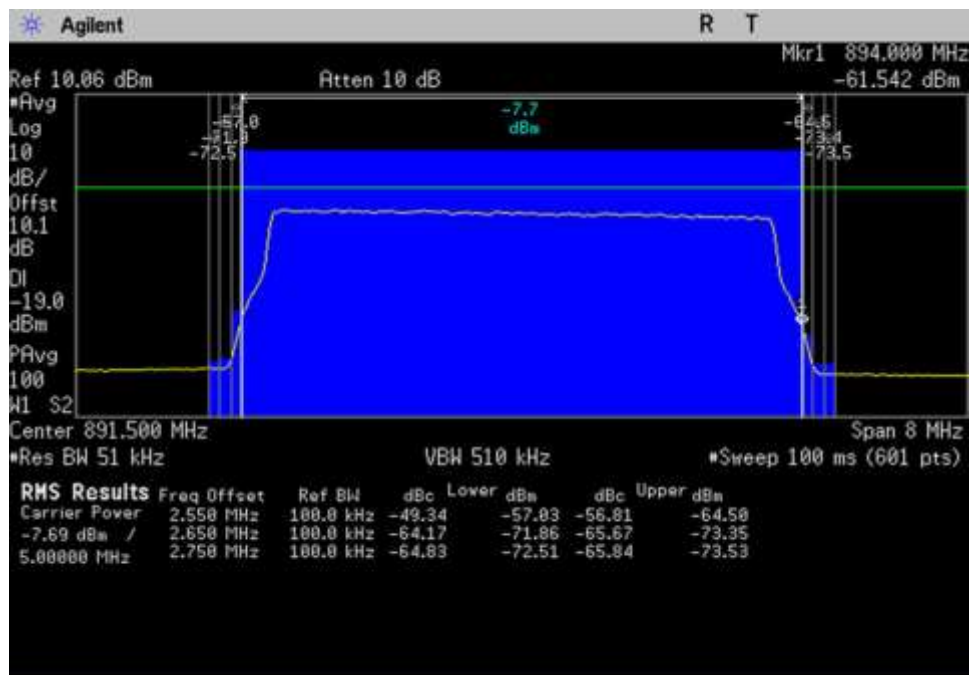
DL\_746-757\_LTE\_ 744.5- 752.5MHz



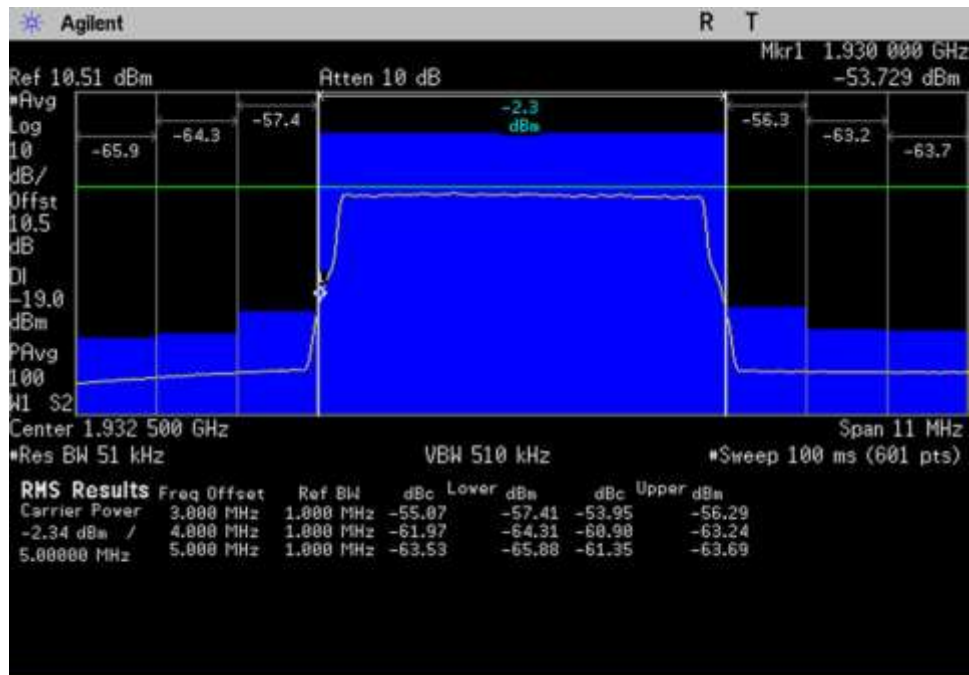
DL\_746-757\_LTE\_ 750.5- 758.5MHz



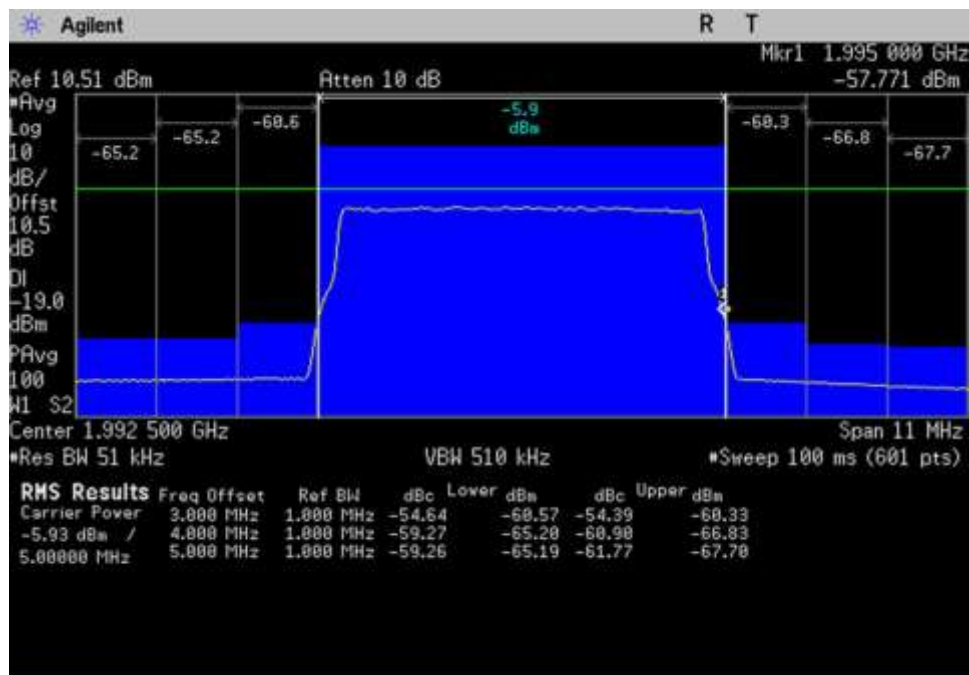
DL\_869-894\_LTE\_867.5-875.5MHz



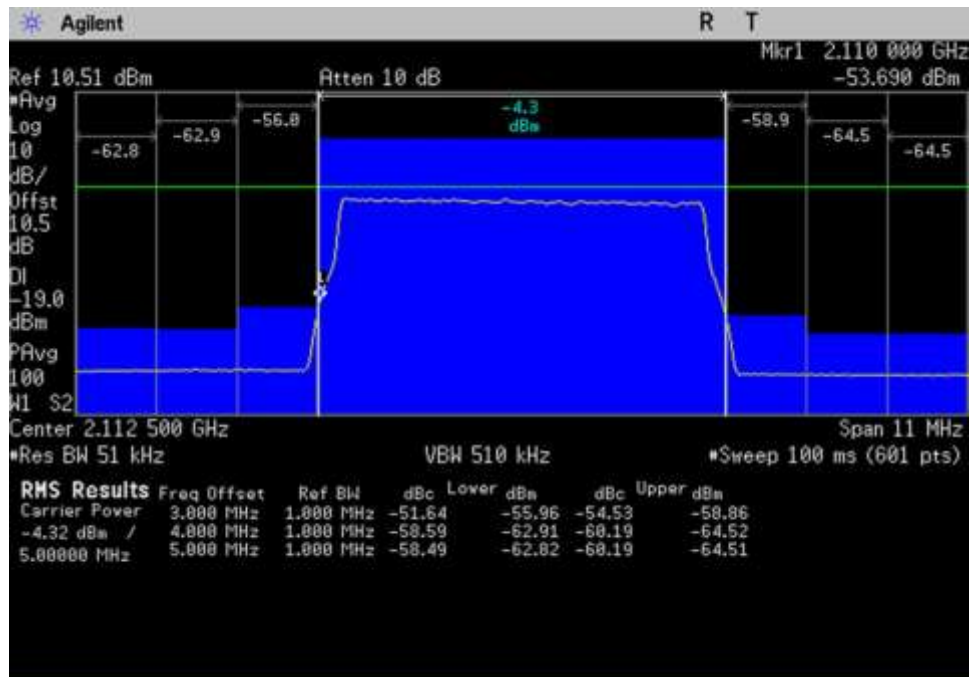
DL\_869-894\_LTE\_887.5-895.5MHz



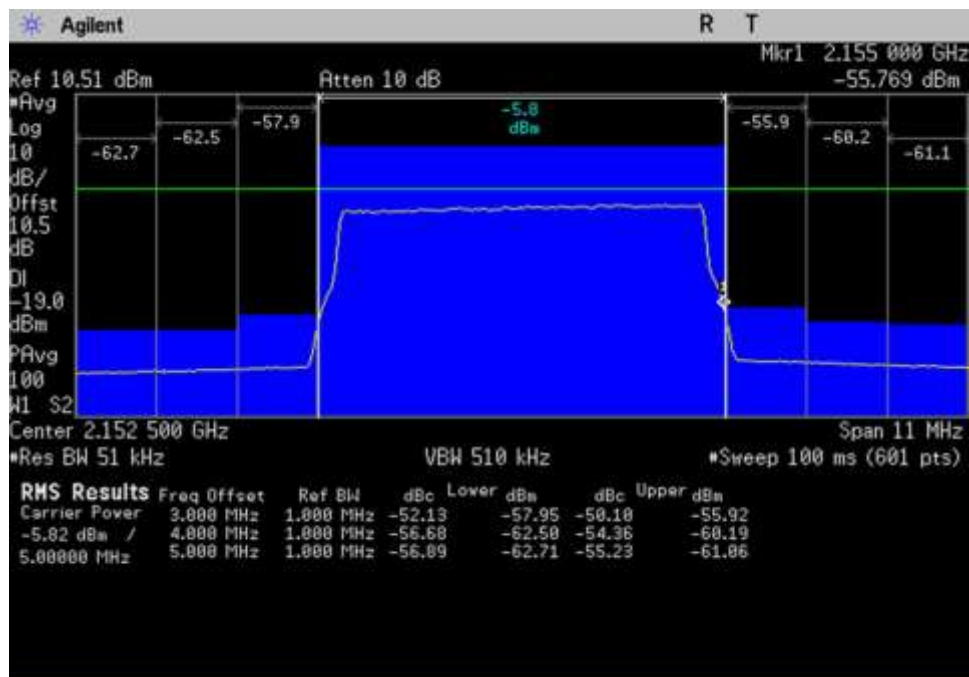
DL\_1930-1995\_LTE\_1927-1938MHz



DL\_1930-1995\_LTE\_1987-1998MHz



DL\_2110-2155\_LTE\_2107-2118MHz



DL\_2110-2155\_LTE\_2147-2158MHz

## 7.6 Conducted Spurious Emissions

### Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170  
 Customer: Cellphone-Mate, Inc.  
 Specification: **7.6 Conducted Spurious Emissions / 47 CFR §2.1051 Spurious Emissions at Antenna Terminals**  
 Work Order #: **101623** Date 08/14/18  
 Test Type: **Conducted Emissions**  
 Tested By: **Hieu S Nguyenpham**  
 Software: EMITest 5.03.11

#### Equipment Tested:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

#### Support Equipment:

| Device | Manufacturer | Model # | S/N |
|--------|--------------|---------|-----|
|        |              |         |     |

#### Test Conditions / Notes:

Test environment conditions:

Temperature: 22.6°C

Relative Humidity: 48%

Pressure: 101.9kPa

Frequency range of measurement = 30MHz- 22GHz.

30 MHz - 1000MHz -> RBW\*= 1MHz VBW= 3MHz

1000 MHz - 22000MHz ->RBW= 1MHz VBW= 3MHz

\*Note: As specified on 7.6 Conducted spurious emissions test procedure of 935210 D03 Signal Booster Measurements v04r02, for frequencies below 1 GHz, an RBW of 1 MHz may be used in a preliminary measurement. If non-compliant emissions are detected, a final measurement shall be made with a 100 kHz RBW. Additionally, a peak detector may also be used for the preliminary measurement. If non-compliant emissions are detected, then a final measurement of these emissions shall be made with the power averaging (RMS) detector.

27.53 (f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

**Test Equipment:**

| Asset # | Description       | Manufacturer | Model                    | Calibration Date | Cal Due Date |
|---------|-------------------|--------------|--------------------------|------------------|--------------|
| P05411  | Attenuator        | Weinschel    | 54A-10                   | 1/19/2018        | 1/19/2020    |
| P07192  | Cable             | Astro        | 32022-29094K-29094K-48TC | 10/9/2017        | 10/9/2019    |
| P07191  | Cable             | Astro        | 32022-29094K-29094K-48TC | 10/30/2017       | 10/30/2019   |
| 03418   | Signal Generator  | Agilent      | E4438C                   | 6/19/2017        | 6/19/2019    |
| 03470   | Spectrum Analyzer | Agilent      | E4440A                   | 1/3/2018         | 1/3/2020     |

## Summary of Results

Pass: As summarized in plots below, the conducted spurious emissions are within limits.

### 9 KHz-30 MHz

**No Conducted Spurious Emissions were found within 20dB of the limit.**

Per section 27.53 (f), the 1559-1610 band was also investigated and found emission within limits using applied correction (see calculation below).

| Limit Line Calculation* |                                |                           |                       |                                 |
|-------------------------|--------------------------------|---------------------------|-----------------------|---------------------------------|
| Frequency (MHz)         | Antenna Gain- cable loss (dBi) | Limit line EIRP (dBW/MHz) | Limit line EIRP (dBm) | Limit line EIRP corrected (dBm) |
| UL 776-787              | -0.5                           | -70.0                     | -40                   | -40.5                           |

## LIMIT LINE FOR SPURIOUS CONDUCTED EMISSION

$$\text{REQUIRED ATTENUATION} = 43 + 10 \log P \text{ DB}$$

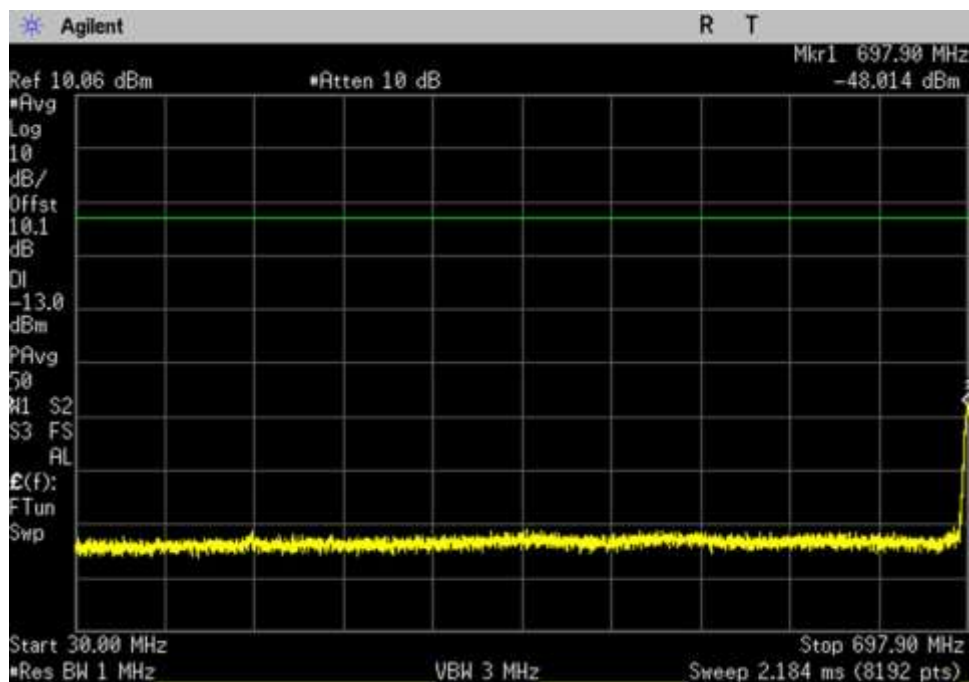
$$\text{Limit line (dBuV)} = V_{\text{dBuV}} - \text{Attenuation}$$

$$\begin{aligned} V_{\text{dBuV}} &= 20 \log \frac{V}{1 \times 10^{-6}} \\ &= 20 (\log V - \log 1 \times 10^{-6}) \\ &= 20 \log V - 20 \log 1 \times 10^{-6} \\ &= 20 \log V - 20 (-6) \\ &= 20 \log V + 120 \end{aligned}$$

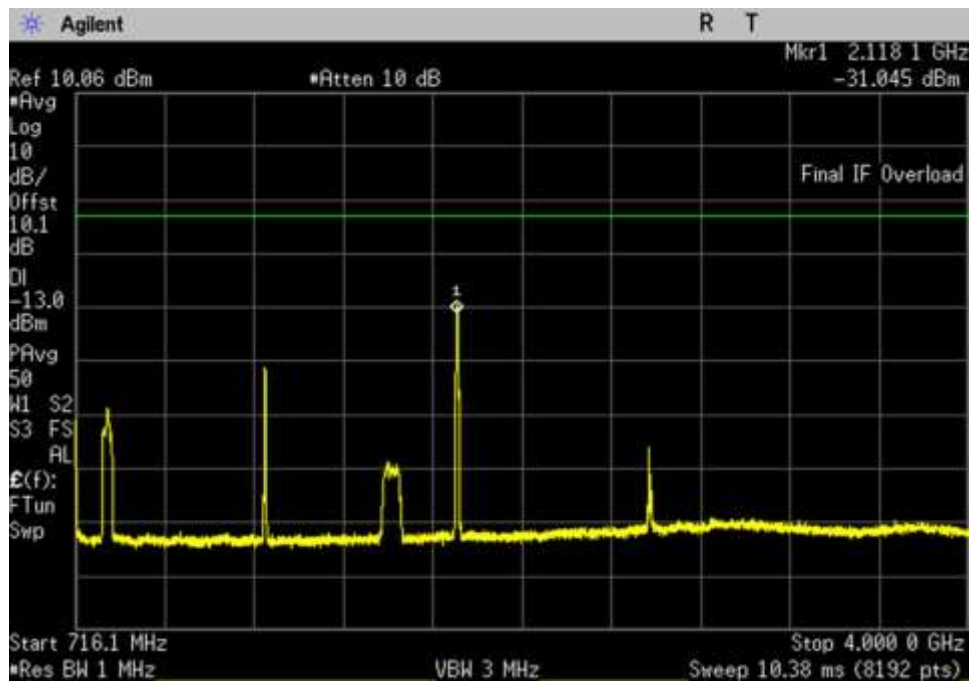
$$\begin{aligned} \text{Attenuation} &= 43 + 10 \log P \\ &= 43 + 10 \log \frac{V^2}{R} \\ &= 43 + 10 (\log V^2 - \log R) \\ &= 43 + 10 (2 \log V - \log R) \\ &= 43 + 20 \log V - 10 \log R \end{aligned}$$

$$\begin{aligned} \text{Limit line} &= V_{\text{dBuV}} - \text{Attenuation} \\ &= 20 \log V + 120 - (43 + 20 \log V - 10 \log R) \\ &= 20 \log V + 120 - 43 - 20 \log V + 10 \log R \\ &= 20 \log V + 120 - 43 - 20 \log V + 10 \log R \\ &= 120 - 43 + 10 \log 50 \quad \text{Note : } R = 50 \Omega \\ &= 120 - 43 + 16.897 \\ &= 94 \text{ dBuV at any power level} \end{aligned}$$

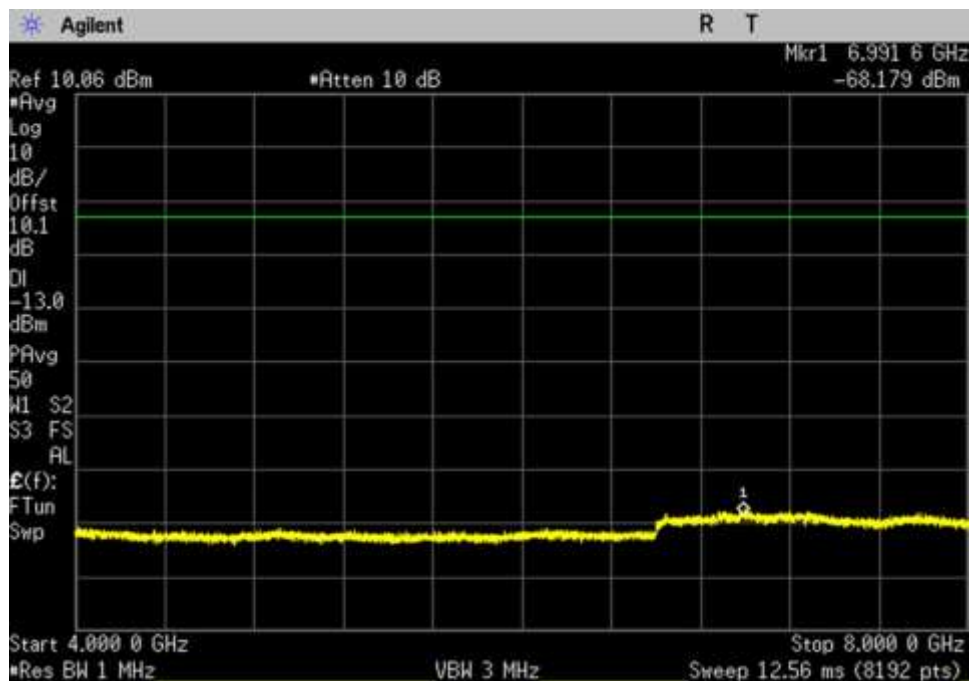
## Plots



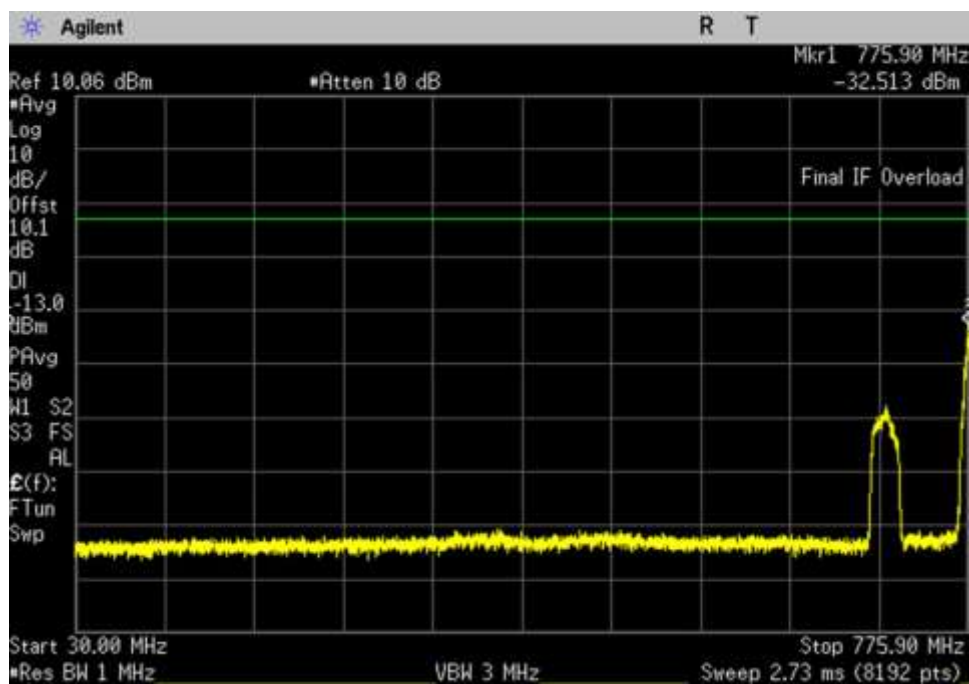
UL\_698-716\_ 30- 697.9MHz



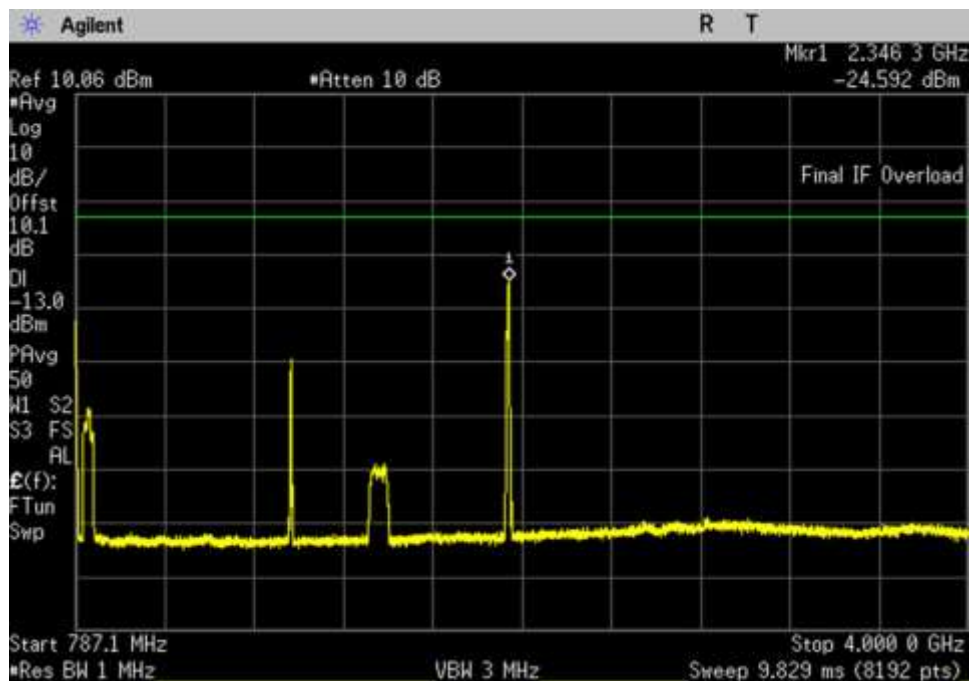
UL\_698-716\_ 716.1- 4000MHz



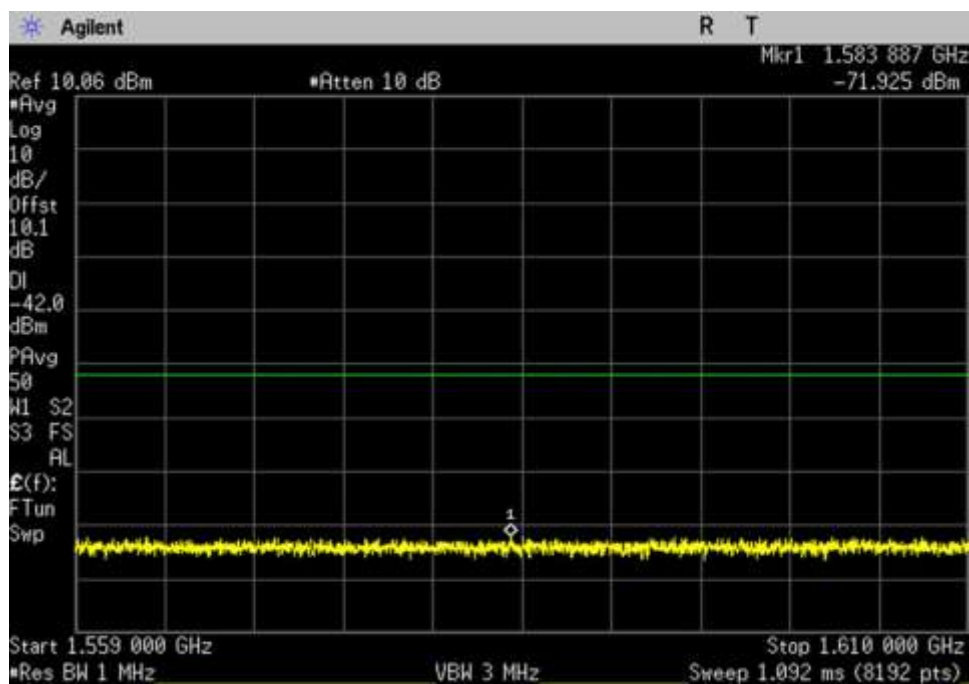
UL\_698-716\_ 4000- 8000MHz



UL\_776-787\_ 30- 775.9MHz



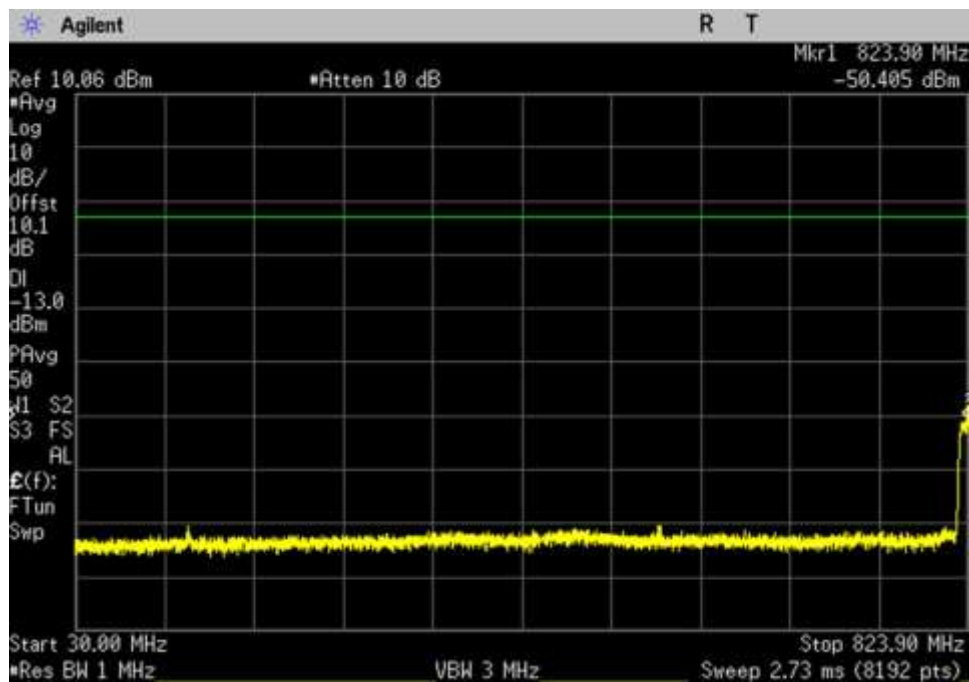
UL\_776-787\_ 787.1- 4000MHz



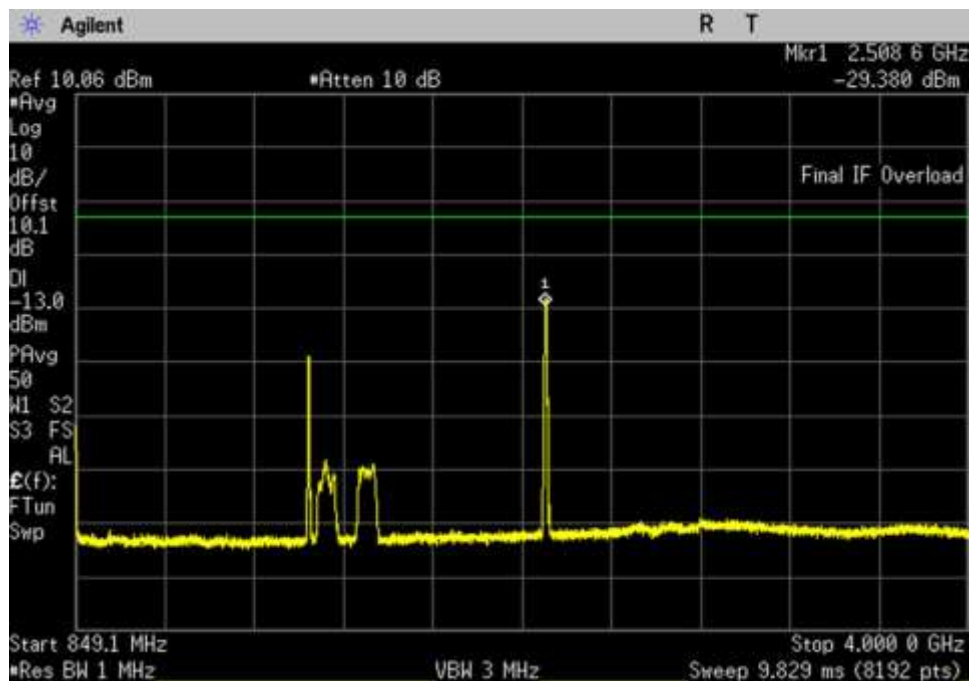
UL\_776-787\_ 1559- 1610MHz



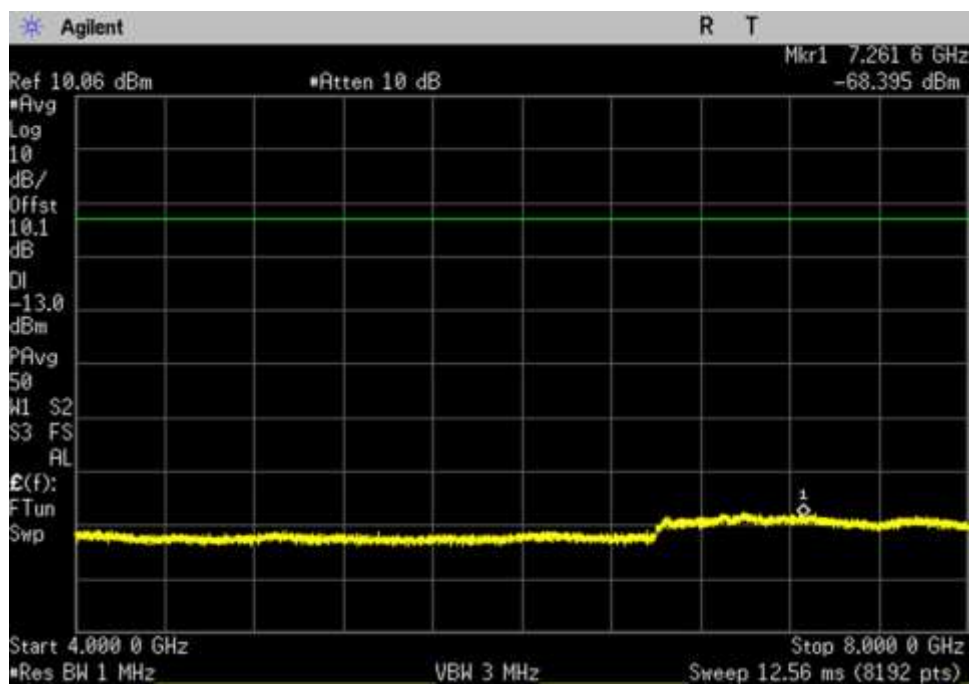
UL\_776-787\_ 4000- 8000MHz



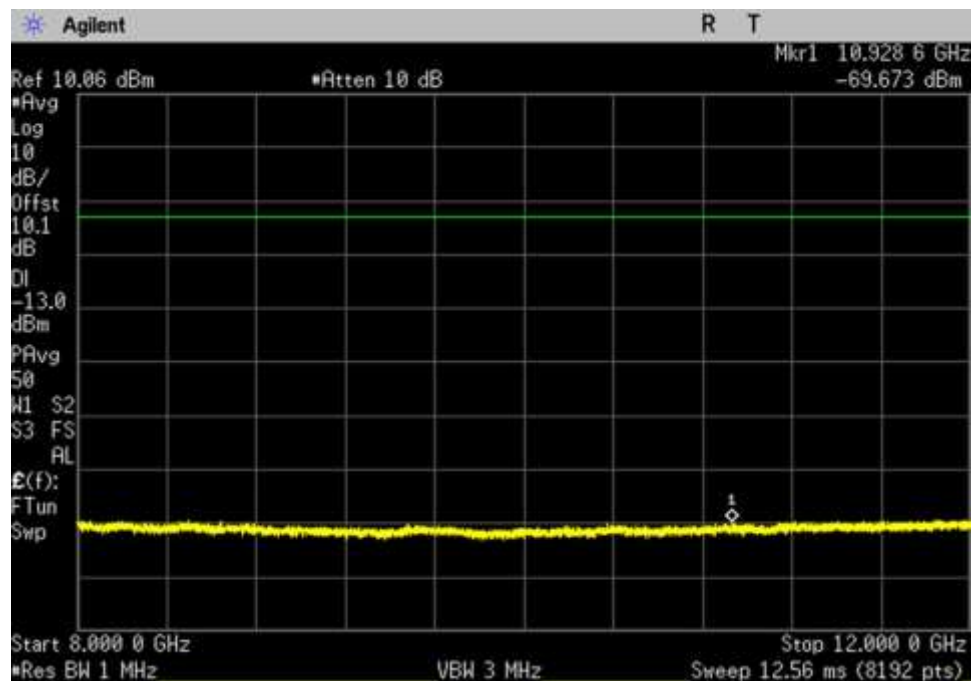
UL\_824-849\_ 30- 823.9MHz



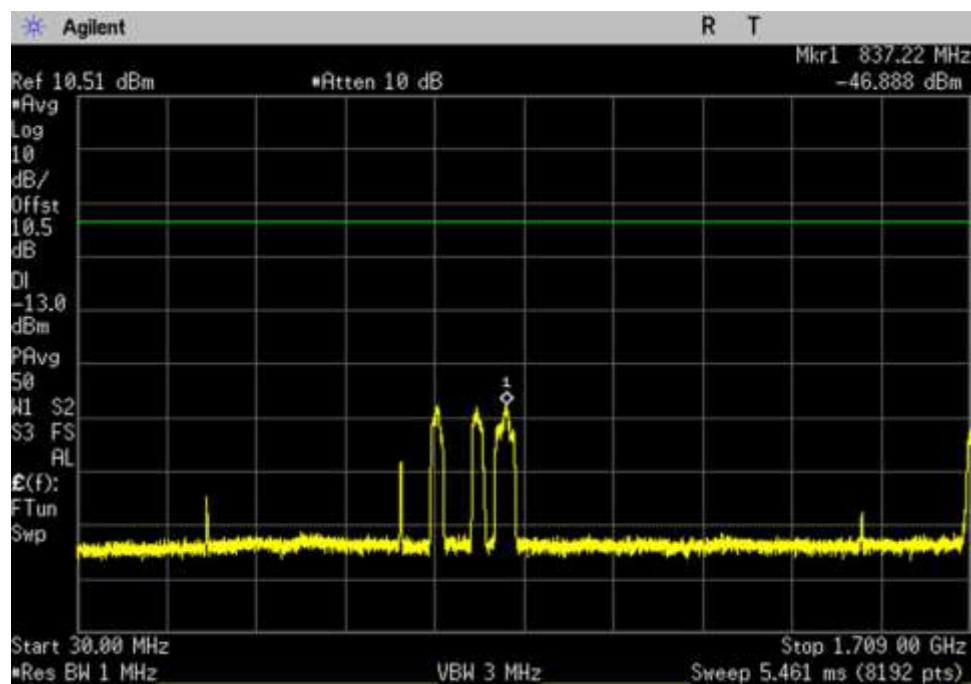
UL\_824-849\_ 849.1- 4000MHz



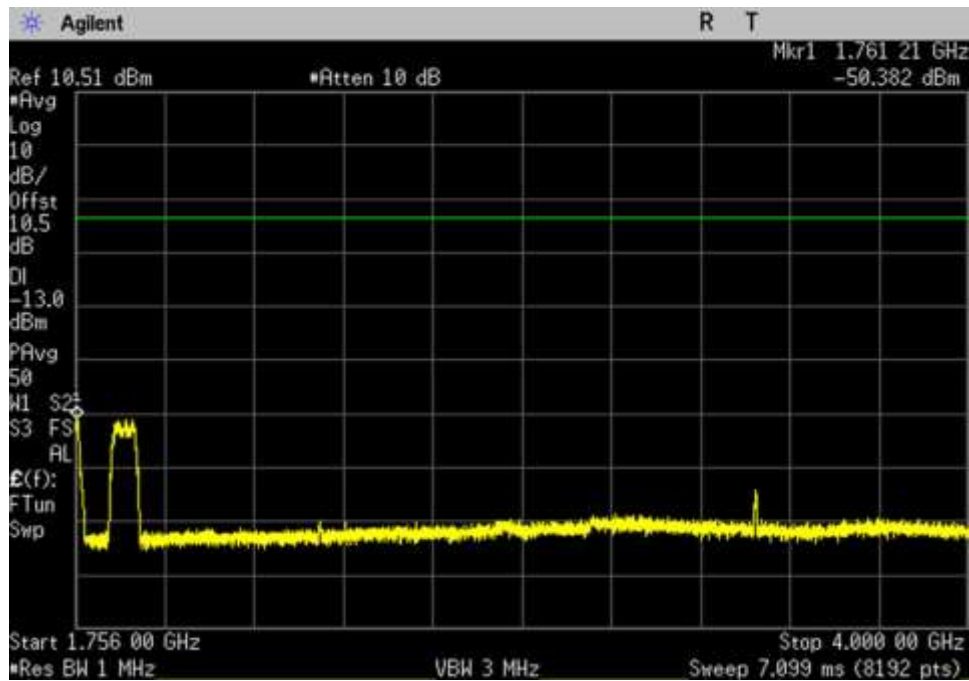
UL\_824-849\_ 4000- 8000MHz



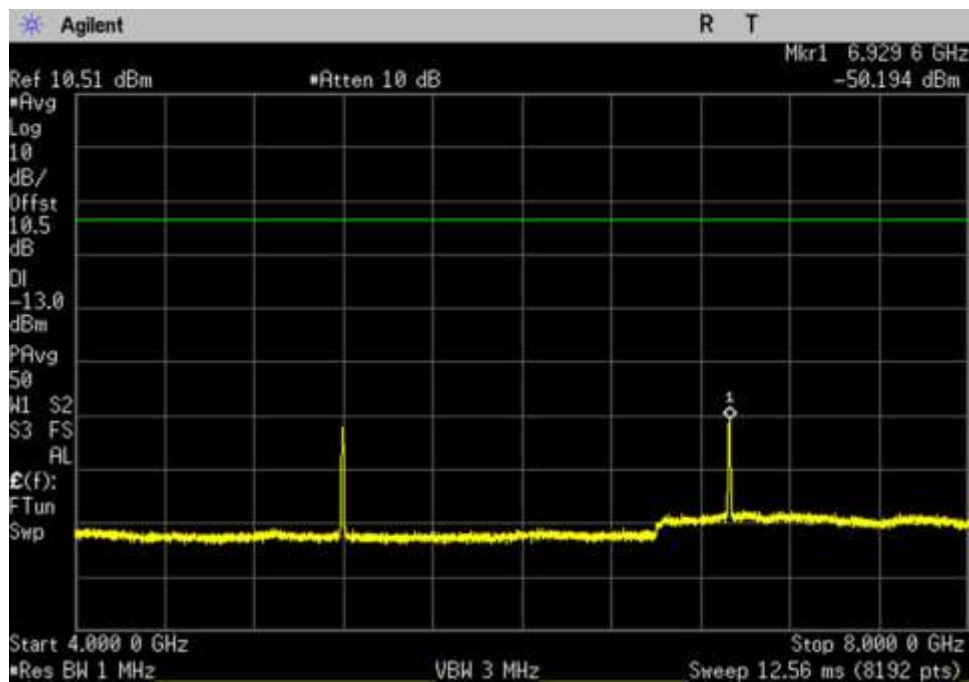
UL\_824-849\_ 8000- 12000MHz



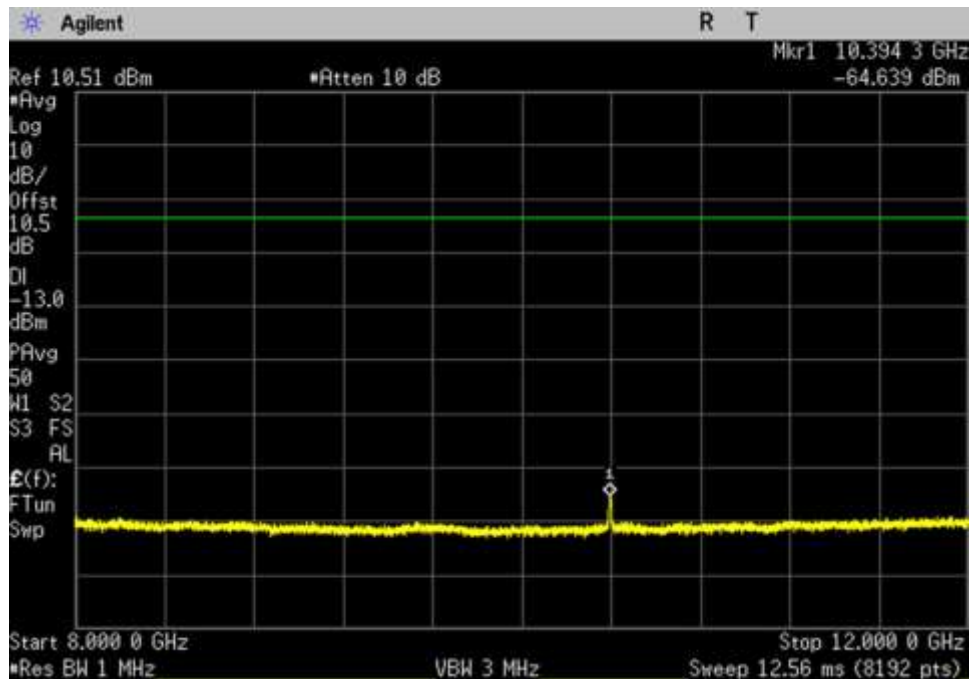
UL\_1710-1755\_ 30- 1709MHz



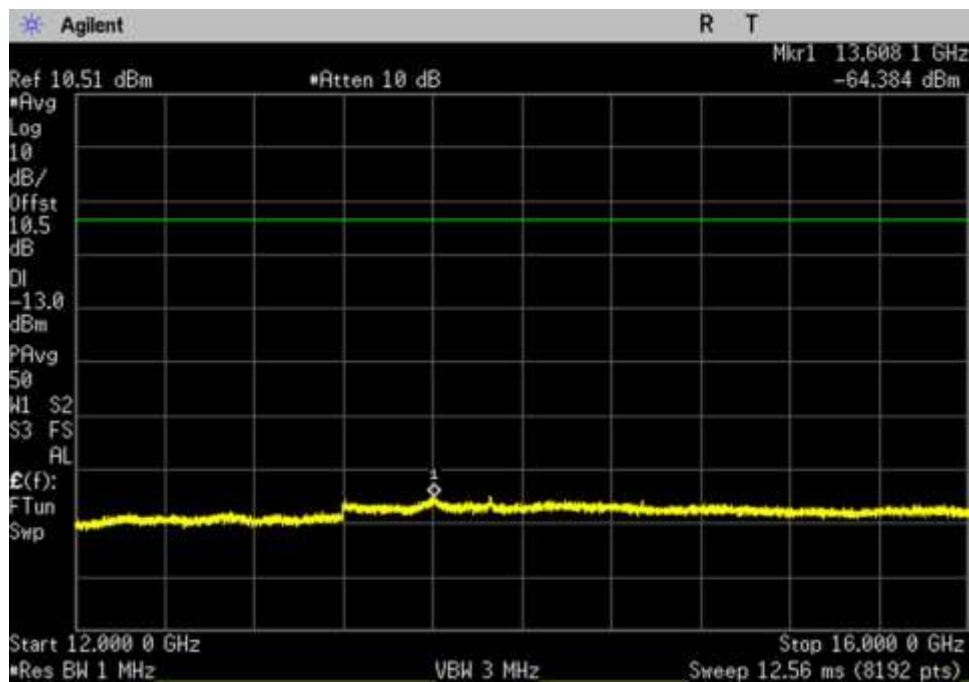
UL\_1710-1755\_ 1756- 4000MHz



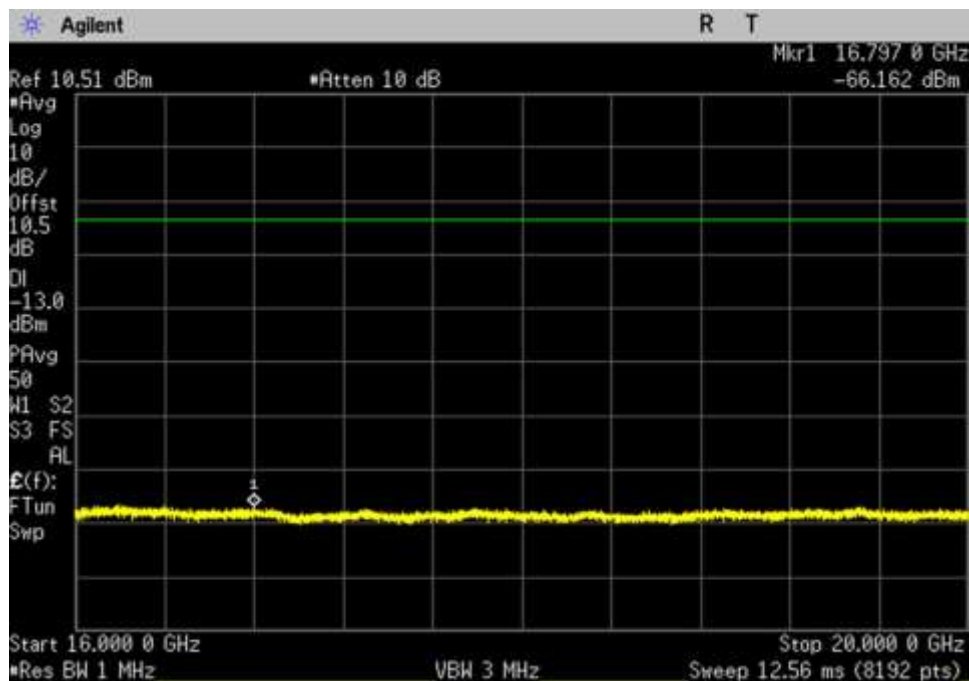
UL\_1710-1755\_ 4000- 8000MHz



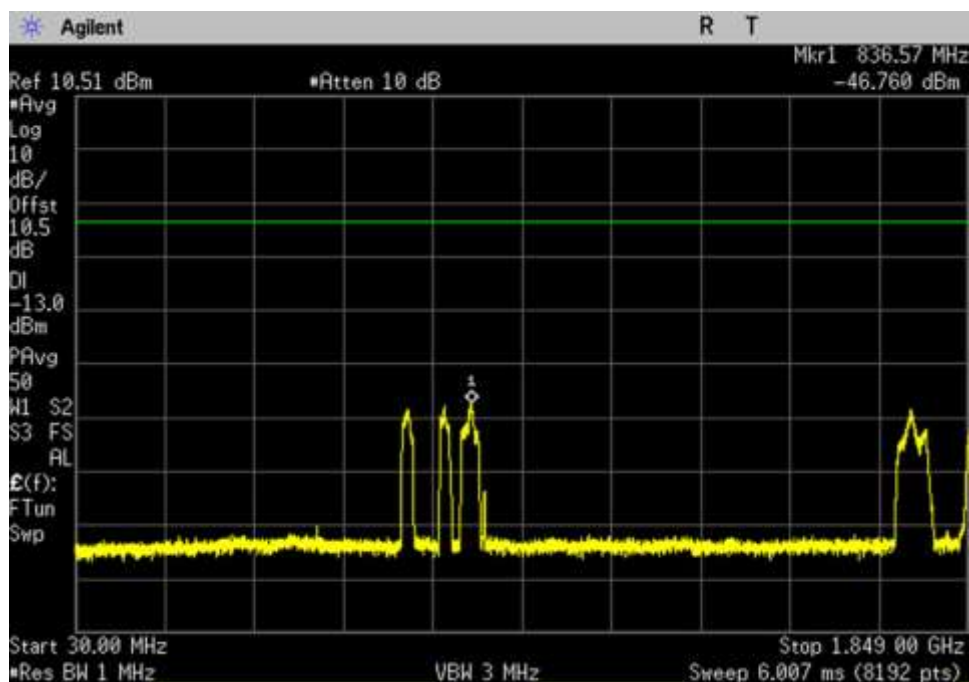
UL\_1710-1755\_ 8000- 12000MHz



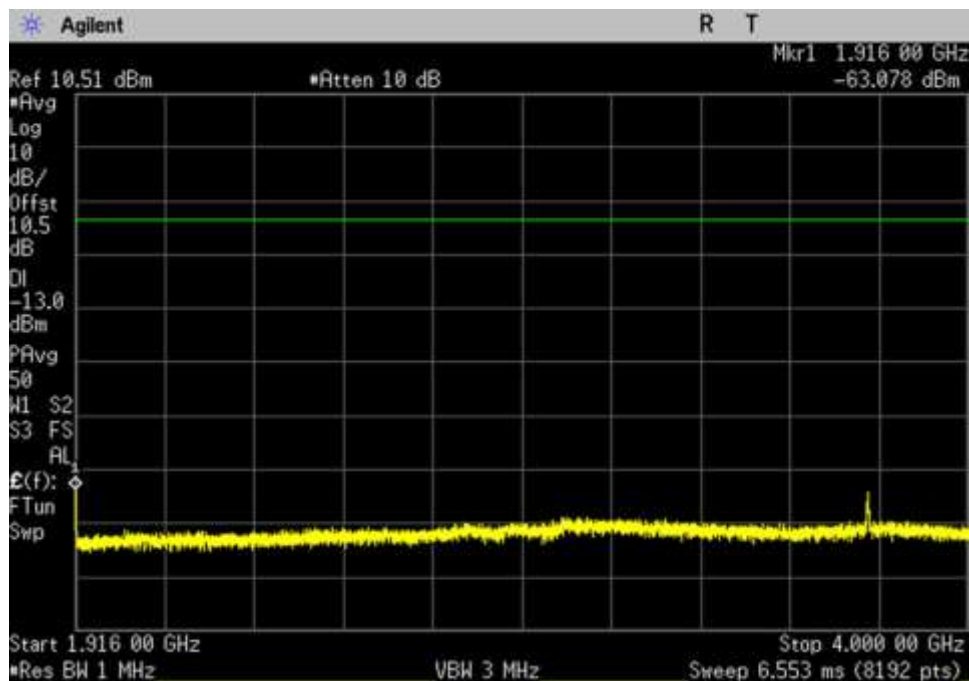
UL\_1710-1755\_ 12000- 16000MHz



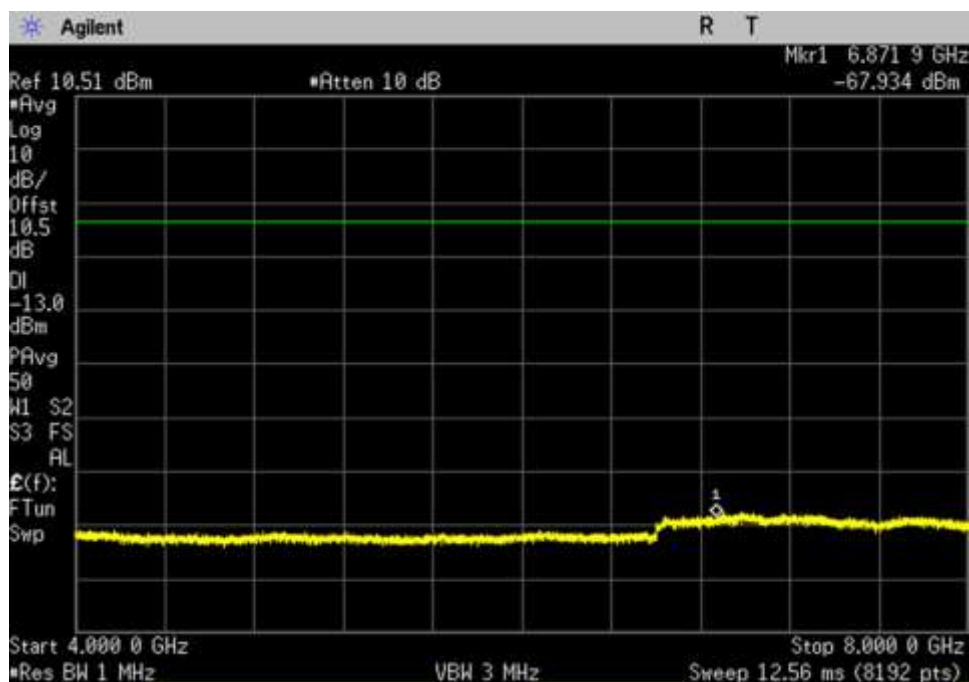
UL\_1710-1755\_ 16000- 20000MHz



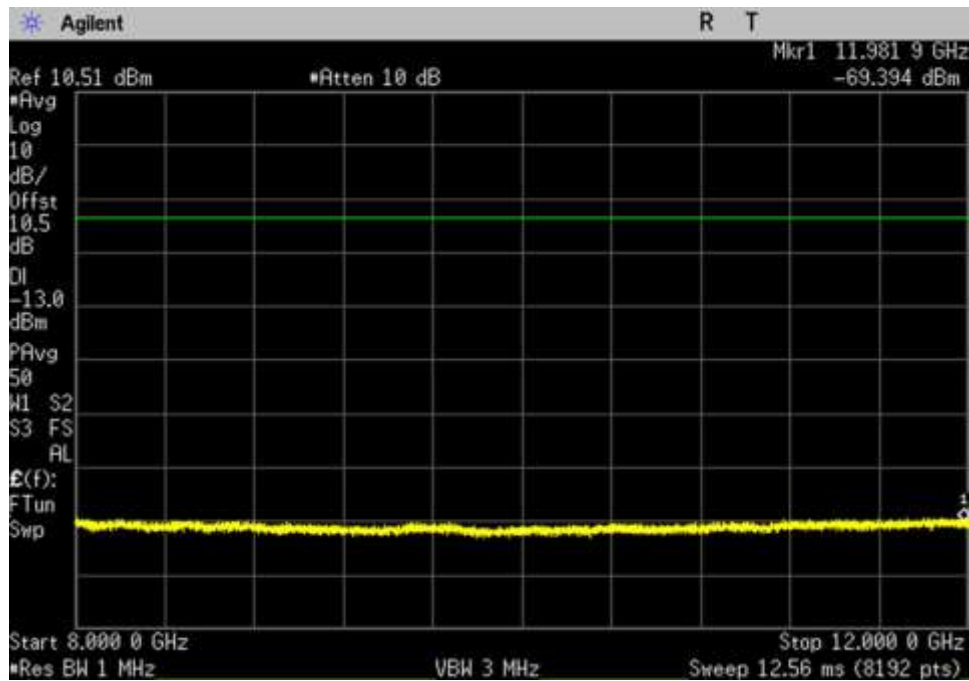
UL\_1850-1915\_ 30- 1849MHz



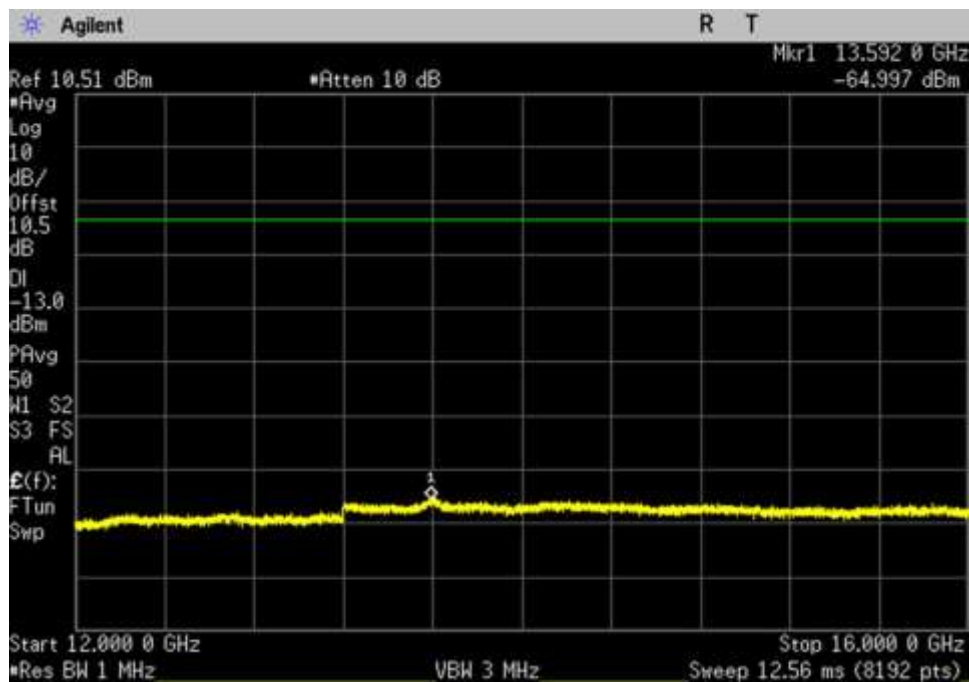
UL\_1850-1915\_ 1916- 4000MHz



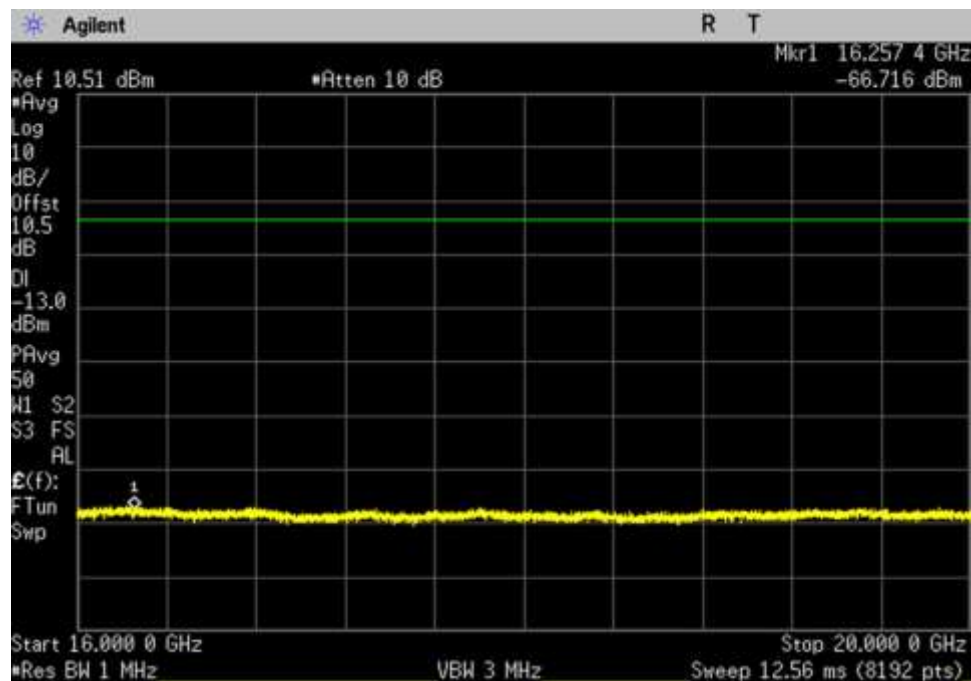
UL\_1850-1915\_ 4000- 8000MHz



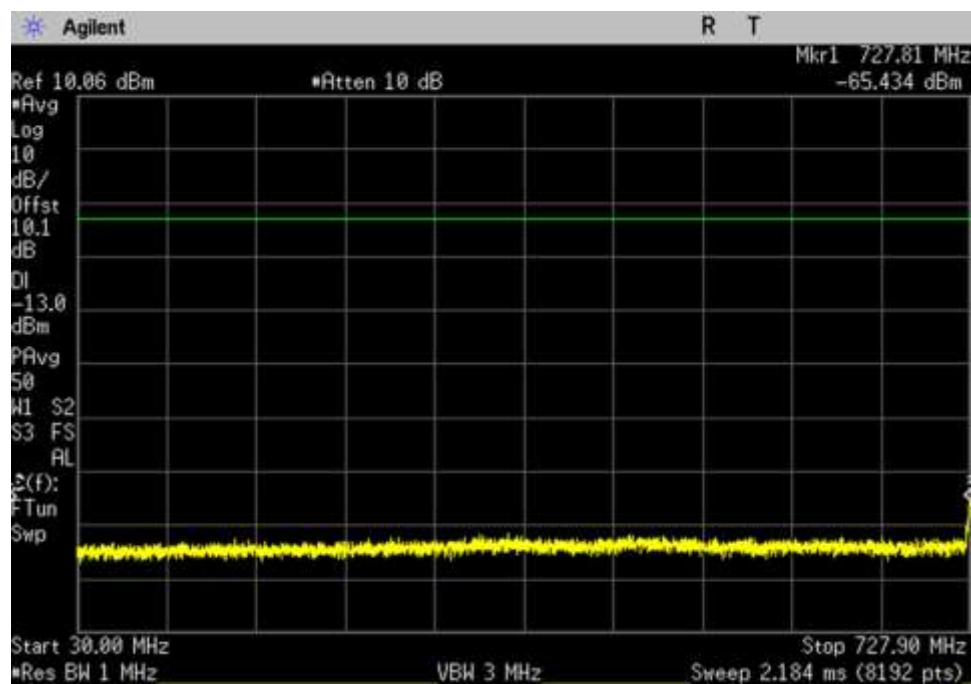
UL\_1850-1915\_ 8000- 12000MHz



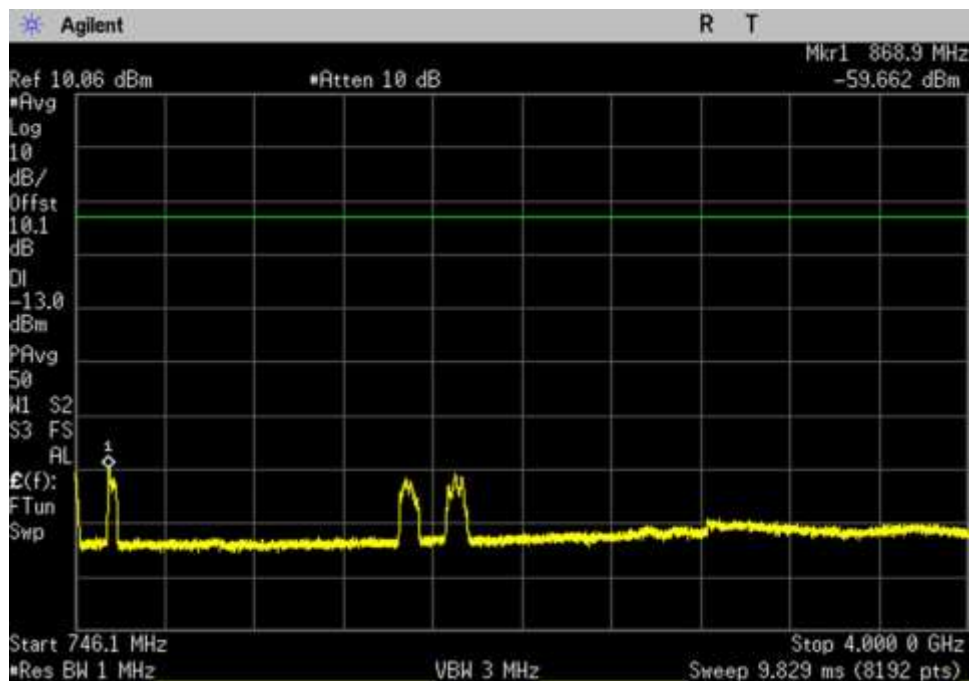
UL\_1850-1915\_ 12000- 16000MHz



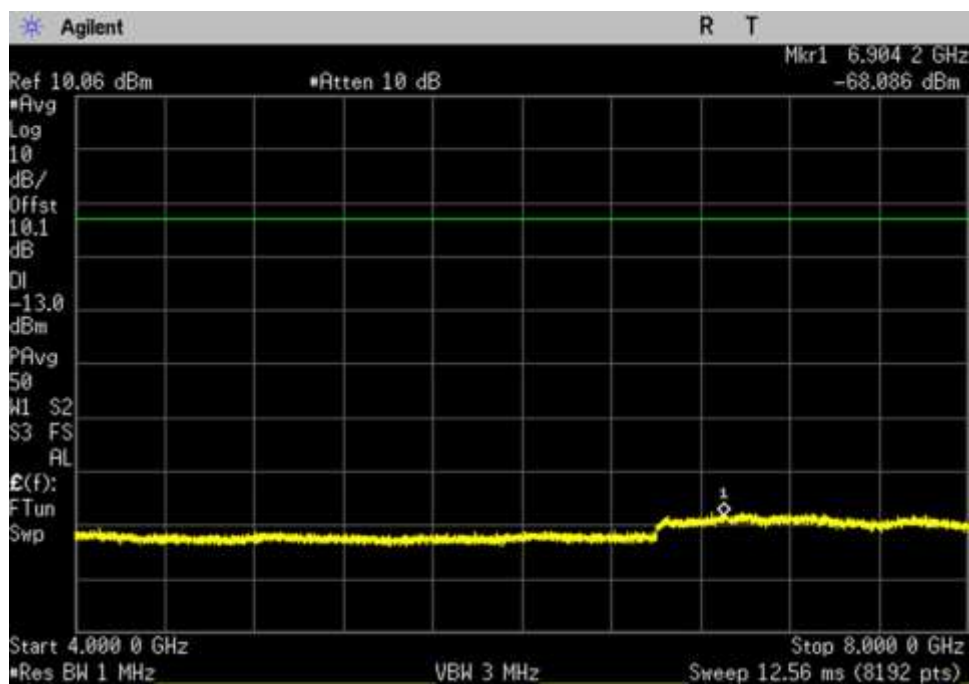
UL\_1850-1915\_ 16000- 20000MHz



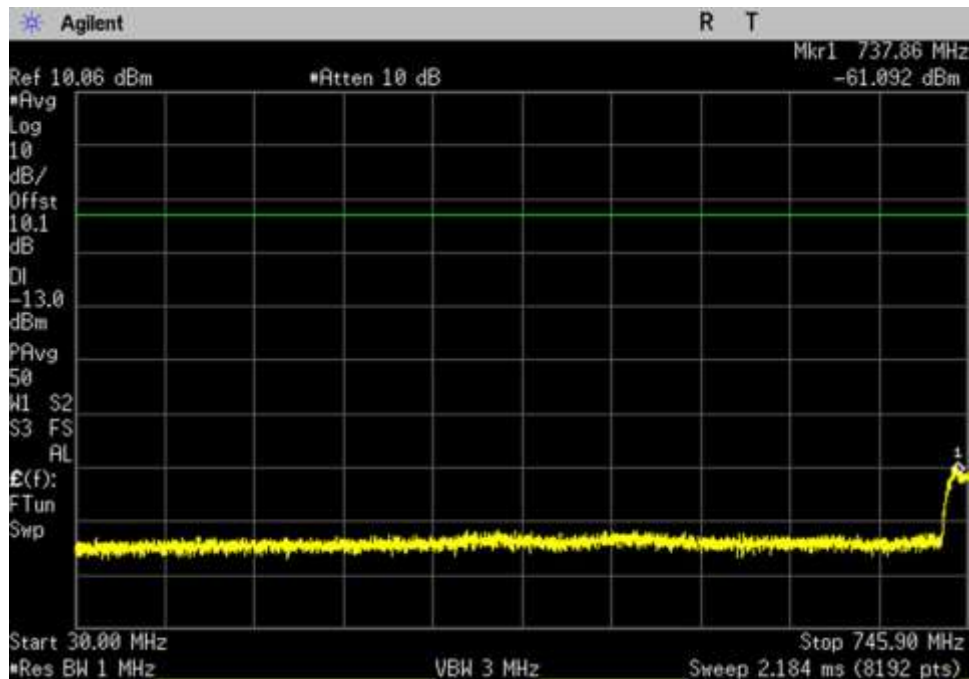
DL\_728-746\_ 30- 727.9MHz



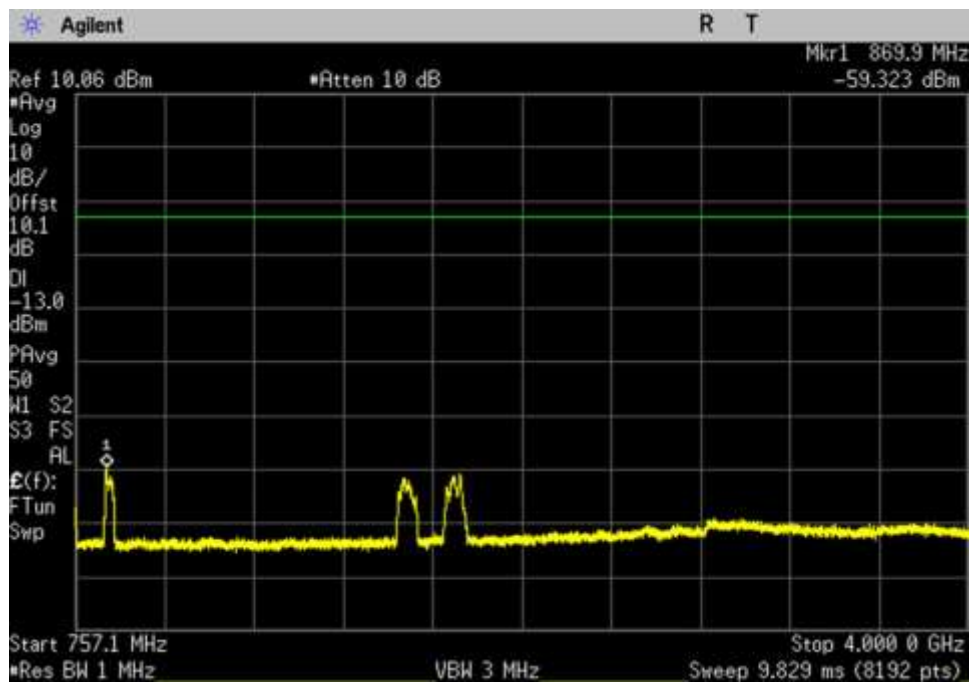
DL\_728-746\_ 746.1- 4000MHz



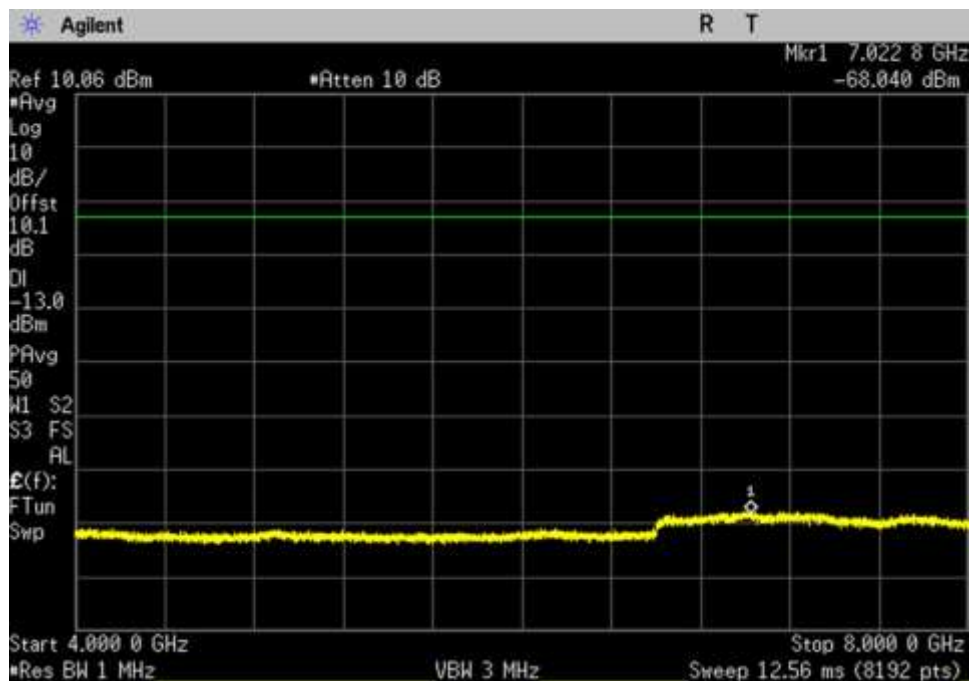
DL\_728-746\_ 4000- 8000MHz



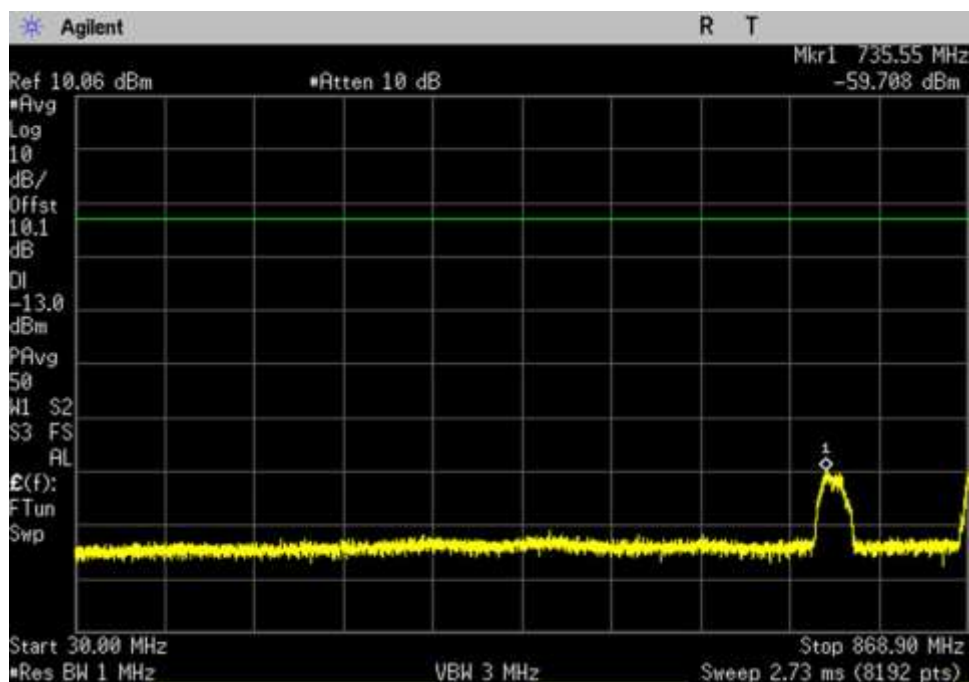
DL\_746-757\_ 30- 745.9MHz



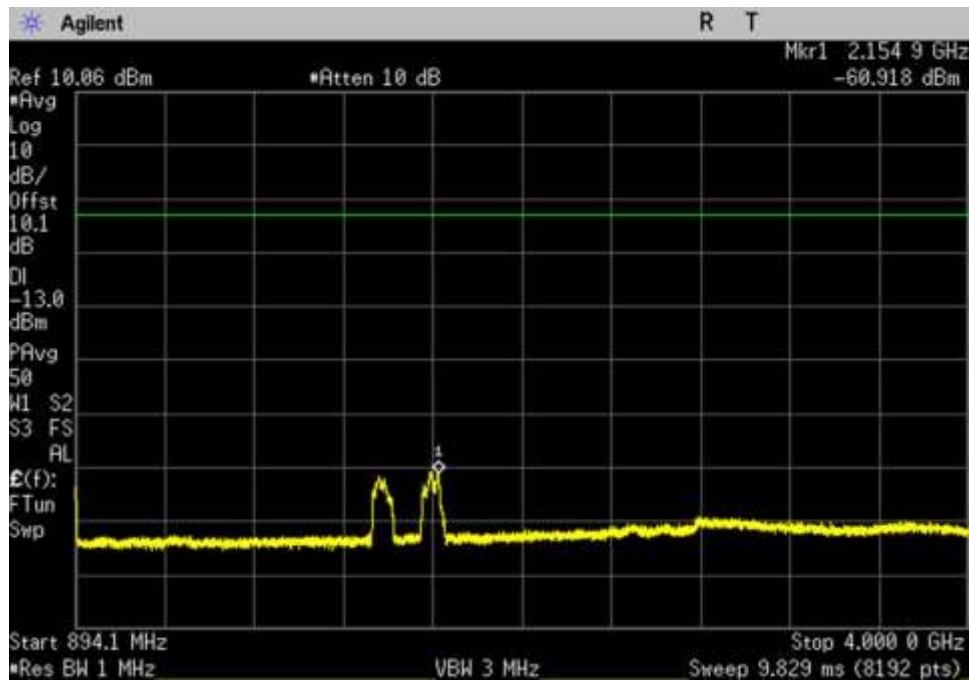
DL\_746-757\_ 757.1- 4000MHz



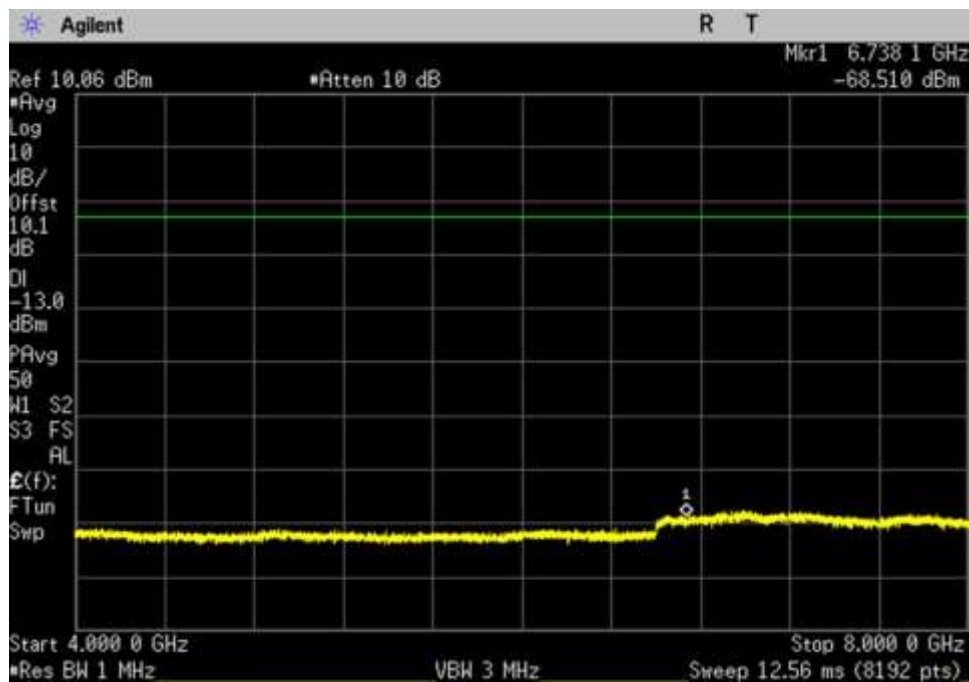
DL\_746-757\_ 4000- 8000MHz



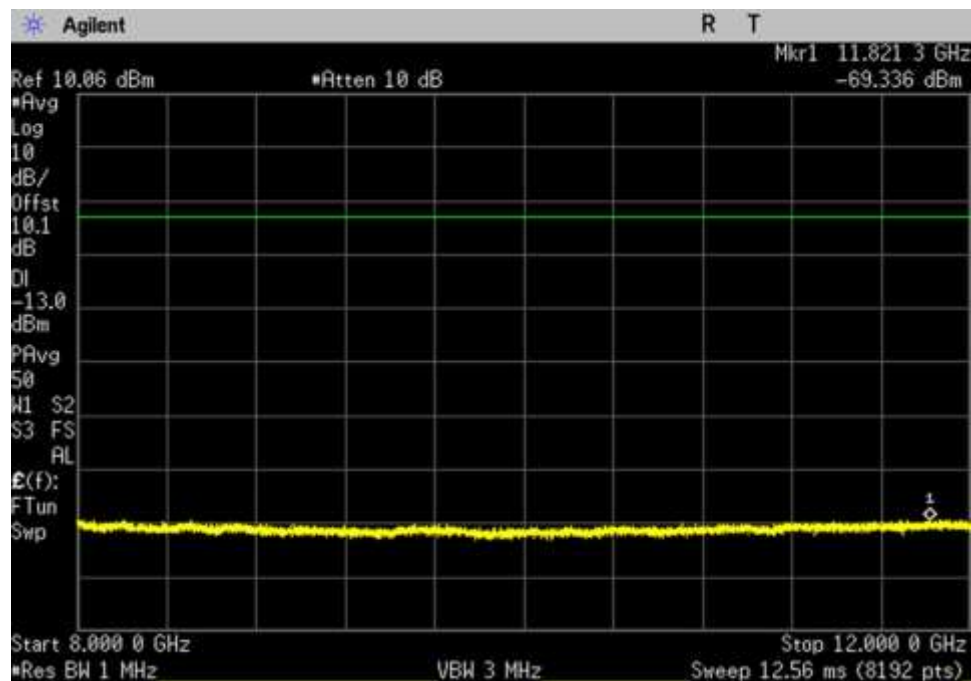
DL\_869-894\_ 30- 868.9MHz



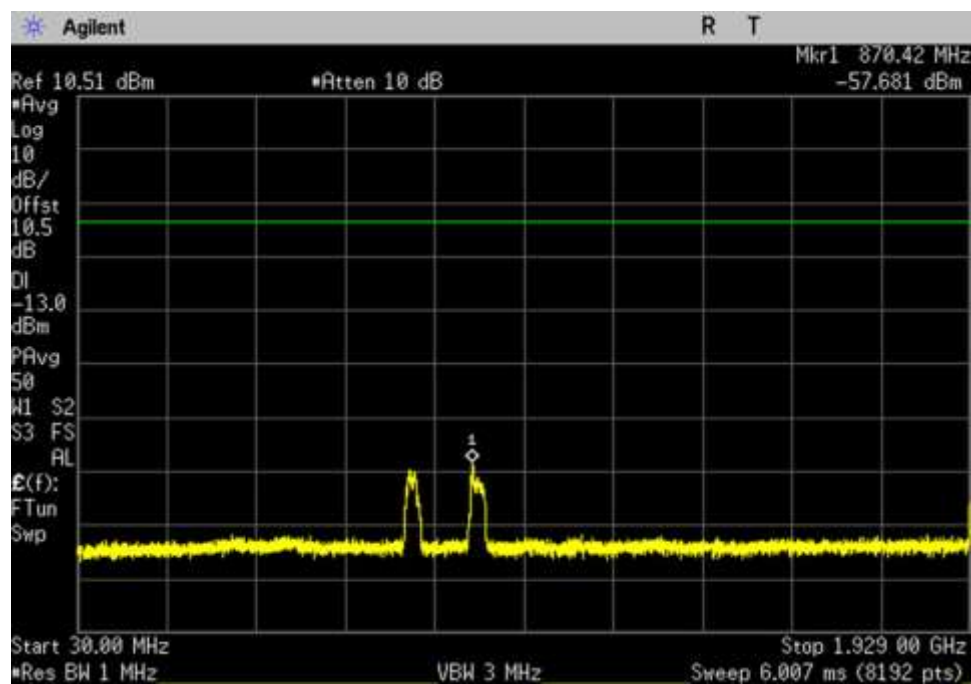
DL\_869-894\_ 894.1- 4000MHz



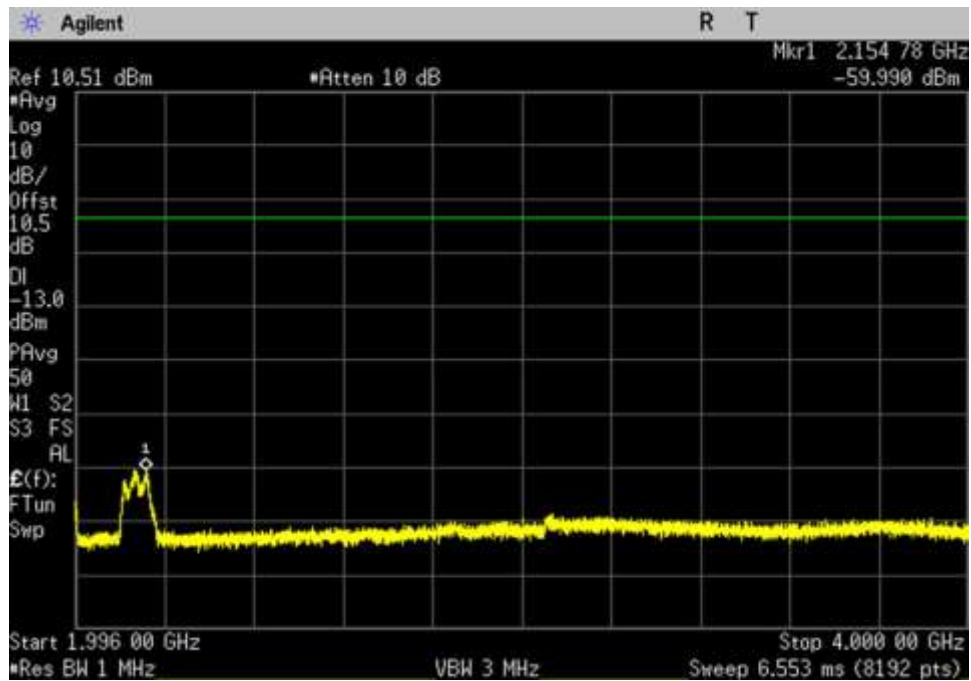
DL\_869-894\_ 4000- 8000MHz



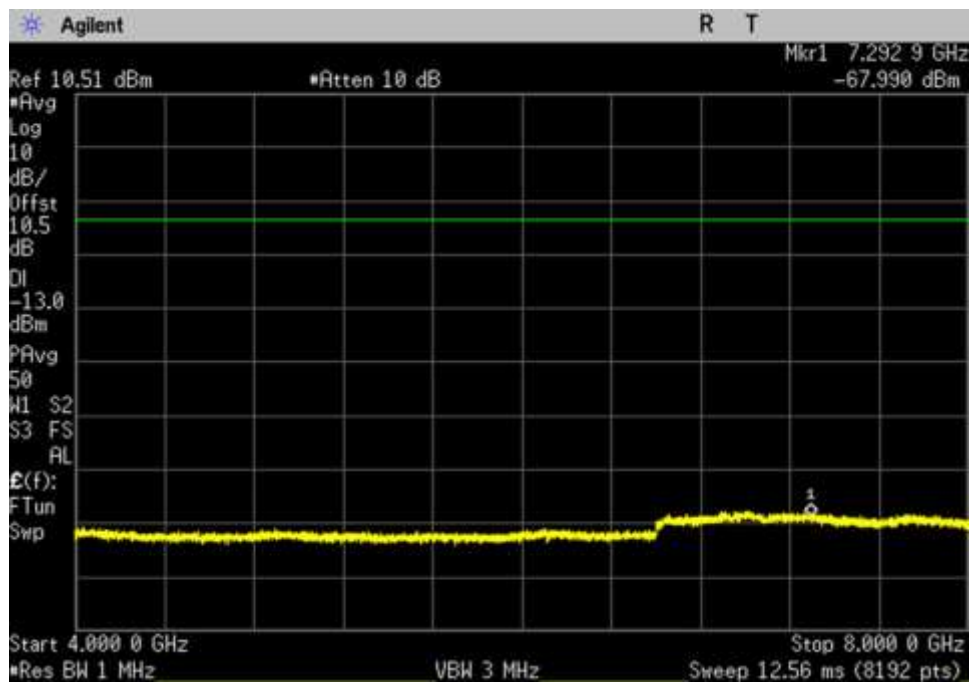
DL\_869-894\_ 8000- 12000MHz



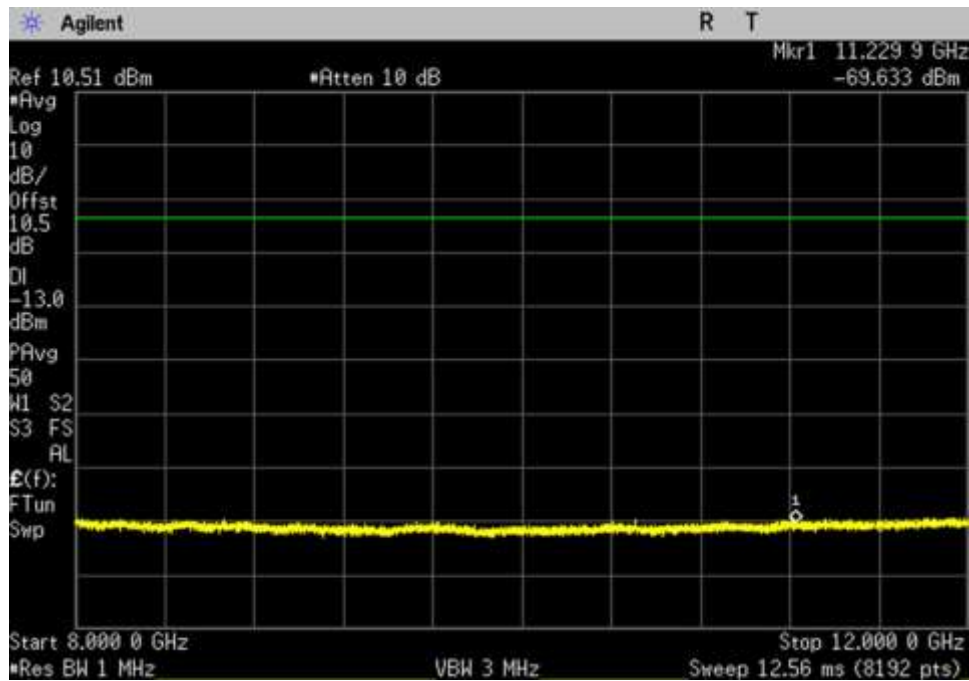
DL\_1930-1995\_ 30- 1929MHz



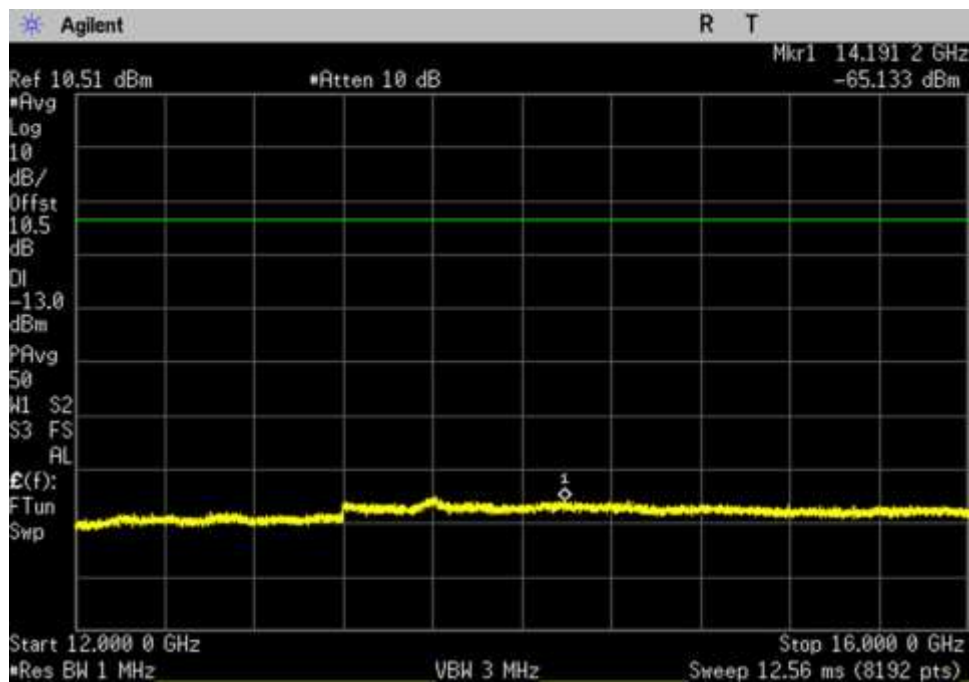
DL\_1930-1995\_ 1996- 4000MHz



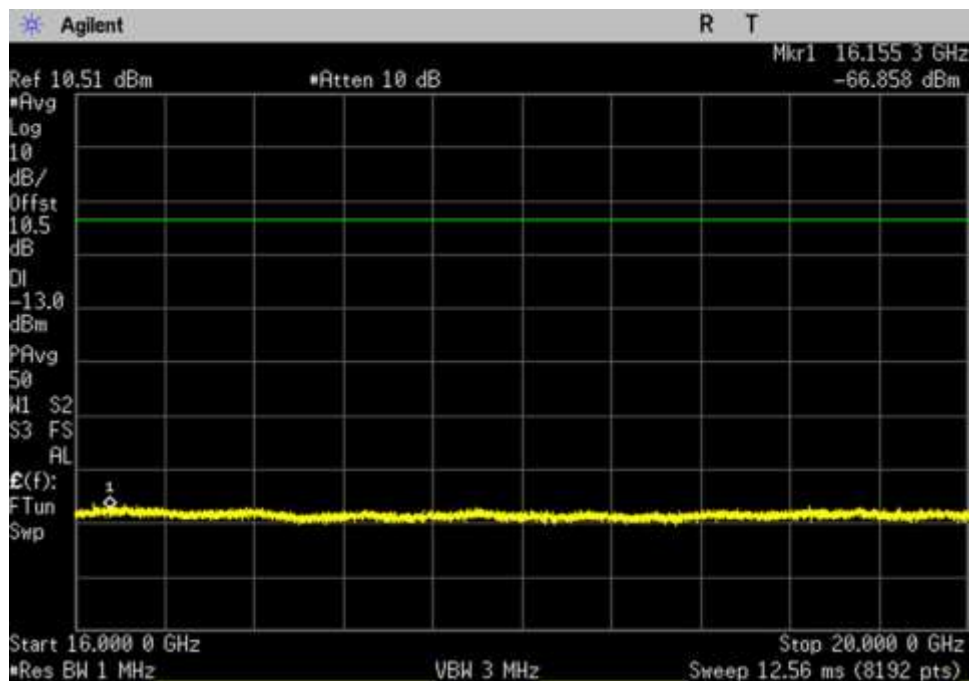
DL\_1930-1995\_ 4000- 8000MHz



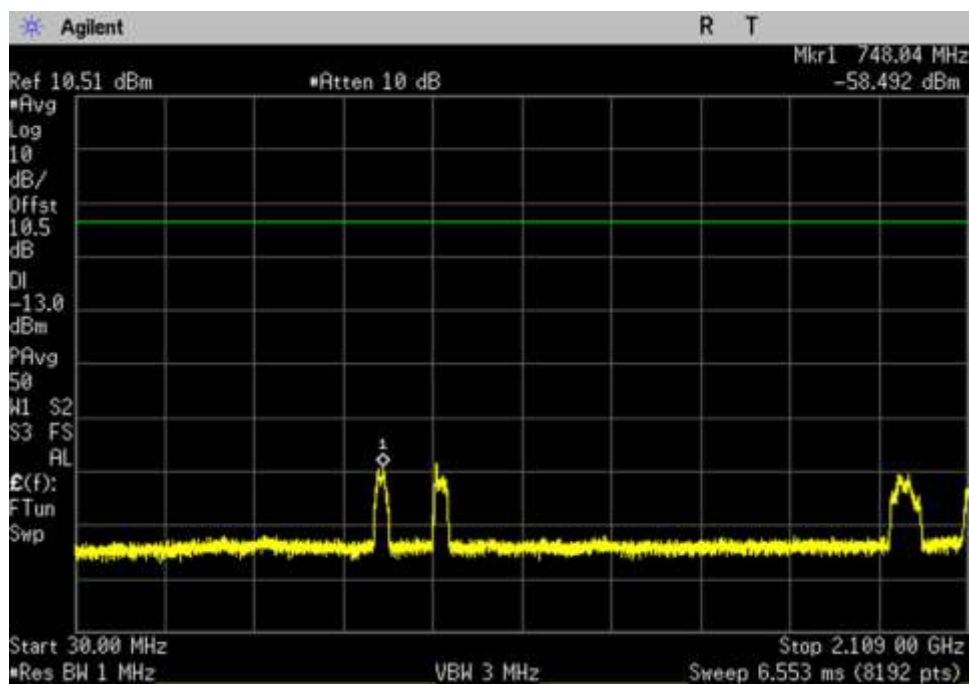
DL\_1930-1995\_ 8000- 12000MHz



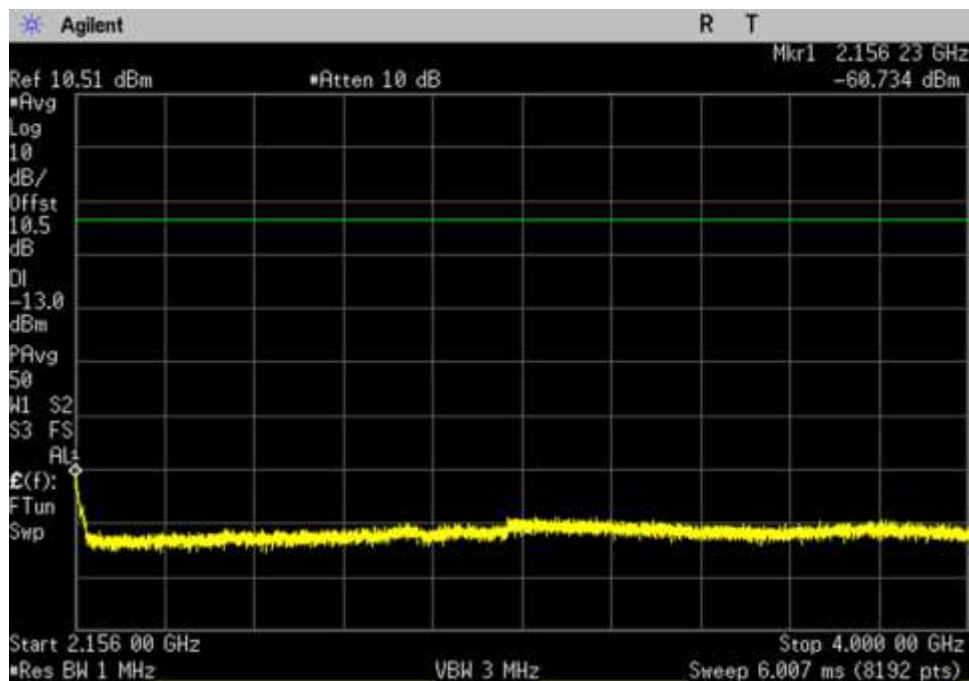
DL\_1930-1995\_ 12000- 16000MHz



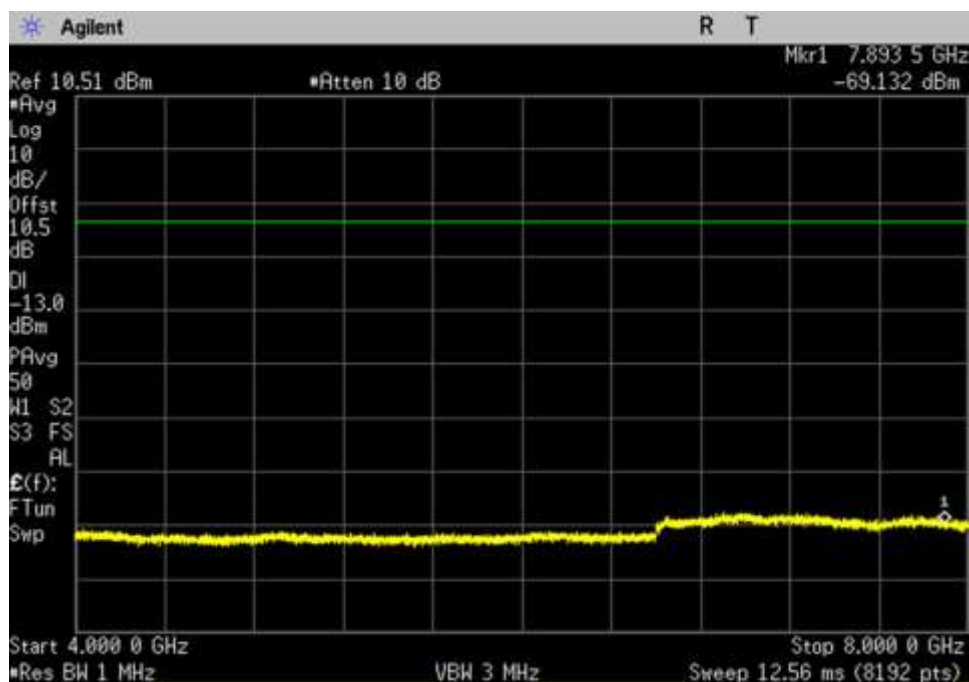
DL\_1930-1995\_ 16000- 20000MHz



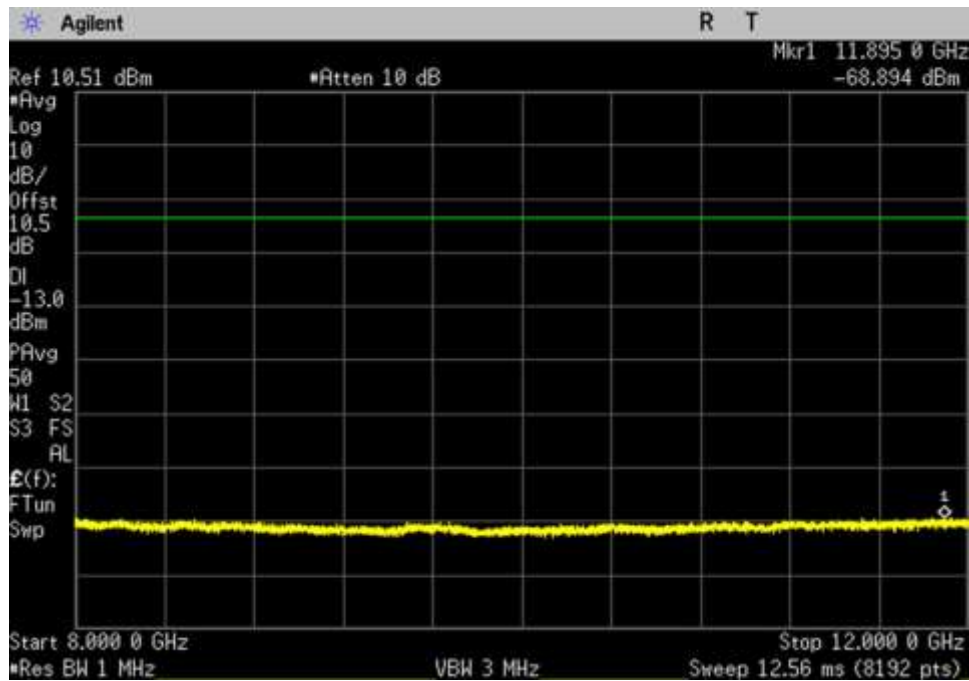
DL\_2110-2155\_ 30- 2109MHz



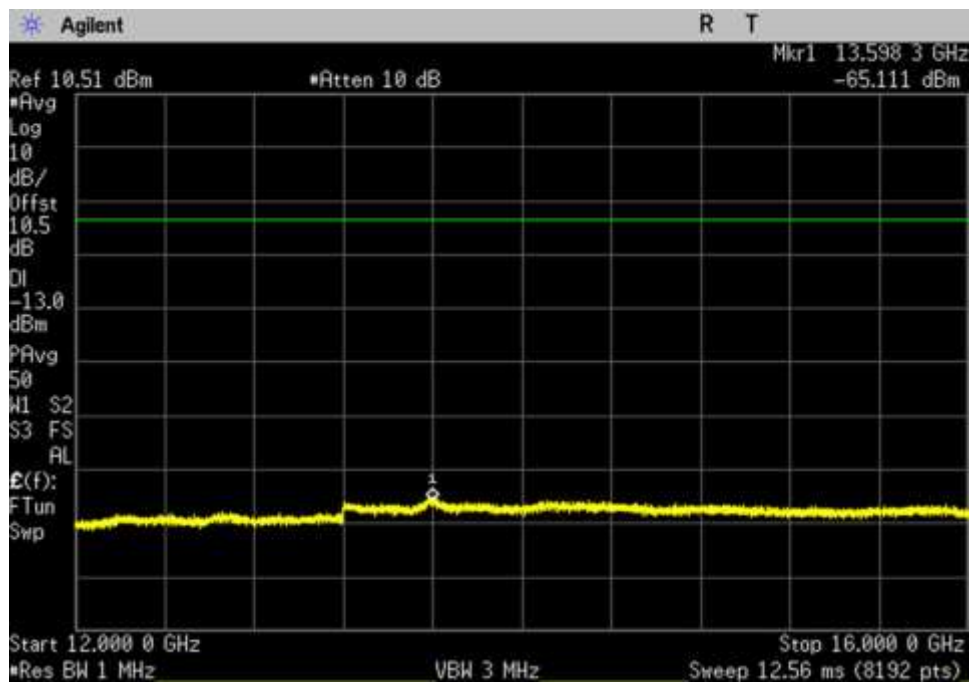
DL\_2110-2155\_ 2156- 4000MHz



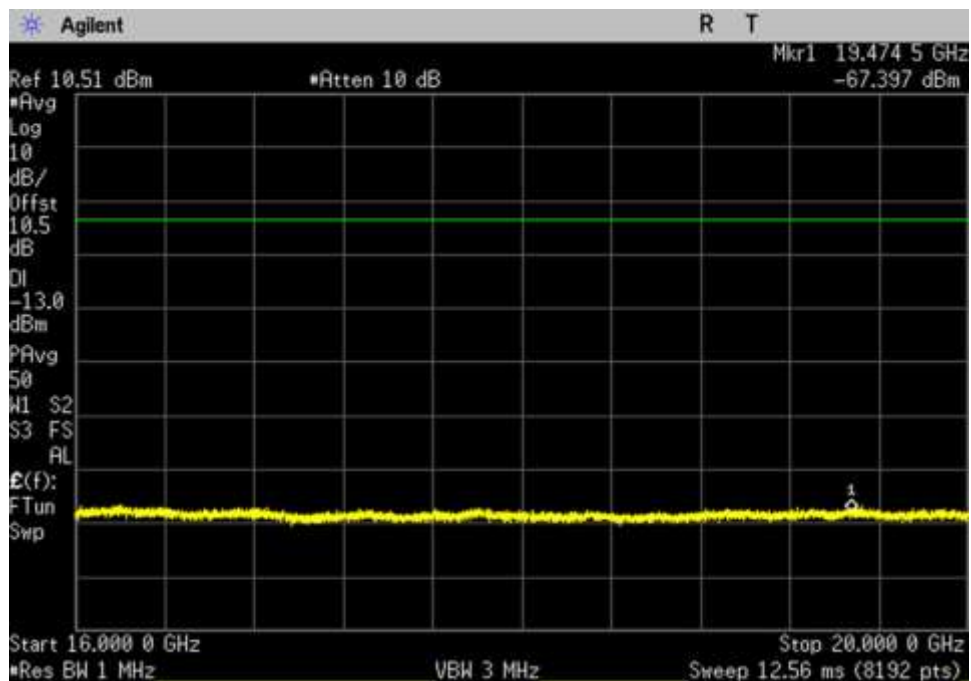
DL\_2110-2155\_ 4000- 8000MHz



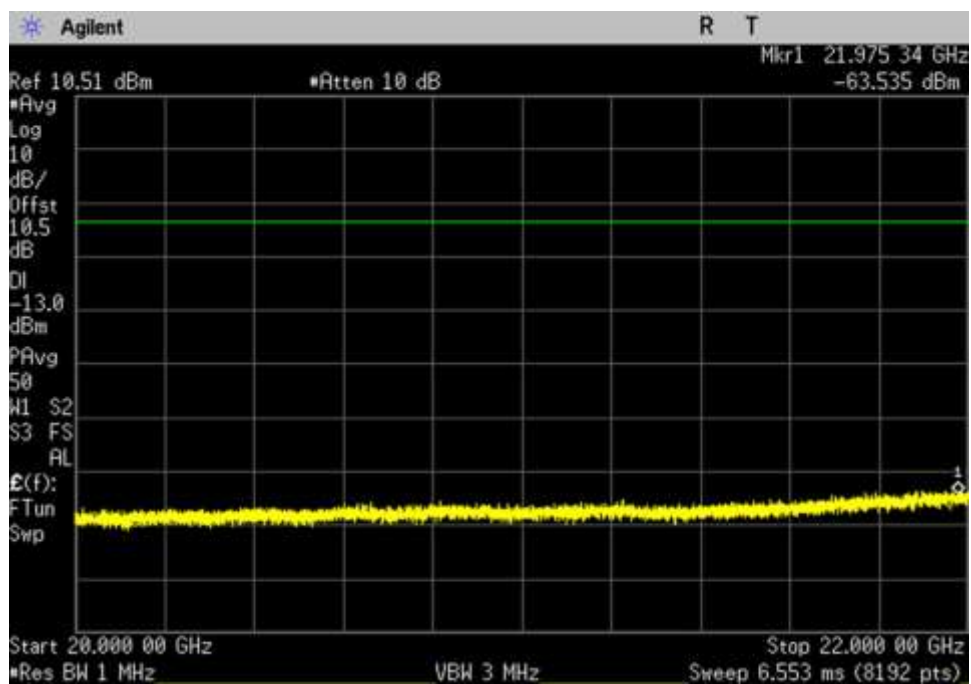
DL\_2110-2155\_ 8000- 12000MHz



DL\_2110-2155\_ 12000- 16000MHz



DL\_2110-2155\_ 16000- 20000MHz



DL\_2110-2155\_ 20000- 22000MHz

## 7.7 Noise limit

### Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170  
 Customer: Cellphone-Mate, Inc.  
 Specification: **7.7 Noise Limit (Maximum Transmitter Noise Power Level / Variable UL Noise Timing)**  
 Work Order #: **101623** Date: 08/22/18  
 Test Type: **Conducted Emissions**  
 Tested By: **Hieu Song Nguyenpham**  
 Software: EMITest 5.03.11

#### Equipment Tested:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

#### Support Equipment:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

#### Test Conditions / Notes:

Test environment conditions:  
 Temperature: 21.6°C  
 Relative Humidity: 47%  
 Pressure: 101.5kPa

#### Test Equipment:

| Asset # | Description         | Manufacturer           | Model                    | Calibration Date | Cal Due Date |
|---------|---------------------|------------------------|--------------------------|------------------|--------------|
| P07192  | Cable               | Astro                  | 32022-29094K-29094K-48TC | 10/9/2017        | 10/9/2019    |
| P07191  | Cable               | Astro                  | 32022-29094K-29094K-48TC | 10/30/2017       | 10/30/2019   |
| 03418   | Signal Generator    | Agilent                | E4438C                   | 6/19/2017        | 6/19/2019    |
| 03470   | Spectrum Analyzer   | Agilent                | E4440A                   | 1/3/2018         | 1/3/2020     |
| C00082  | Directional Coupler | MECA Electronics, Inc. | 722-10-1.500V            | 9/18/2017        | 9/18/2019    |
| P05411  | Attenuator          | Weinschel              | 54A-10                   | 1/19/2018        | 1/19/2020    |

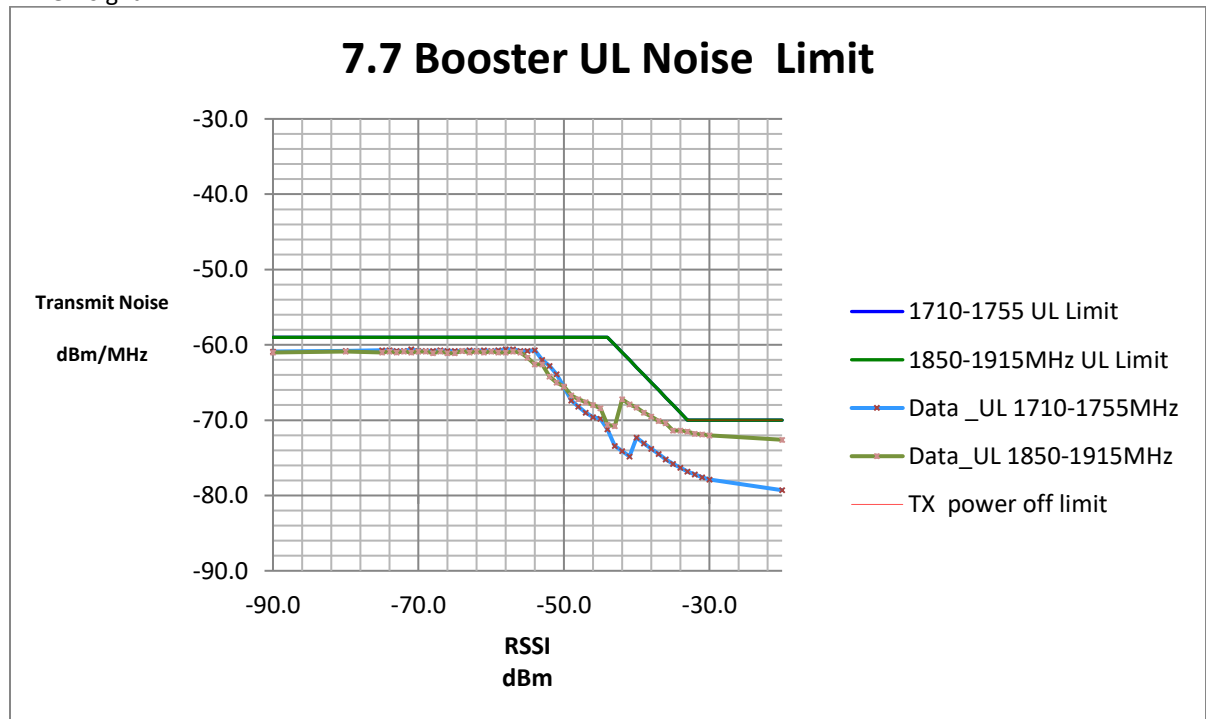
## Summary of Results

### 7.7.1 Maximum transmitter noise power level

- 7.7.1 a-g: Maximum transmitter noise with 50-ohm shielded load

| Maximum Noise Power |                   |               |        |
|---------------------|-------------------|---------------|--------|
| Frequency MHz       | Measured dBm./MHz | Limit dBm/MHz | Margin |
| UL 1710-1755        | -60.4             | -59.0         | -1.4   |
| UL 1850-1915        | -60.3             | -59.0         | -1.3   |
| UL 824-849          | -61.0             | -59.0         | -2.0   |
| UL 698-716          | -60.8             | -59.0         | -1.8   |
| UL 776-787          | -61.1             | -59.0         | -2.1   |
|                     |                   |               |        |
| DL 2110-2155        | -61.0             | -59.0         | -2.0   |
| DL 1930-1995        | -60.5             | -59.0         | -1.5   |
| DL 869-894          | -59.1             | -59.0         | -0.1   |
| DL 728-746          | -60.1             | -59.0         | -1.1   |
| DL 746-757          | -60.2             | -59.0         | -1.2   |

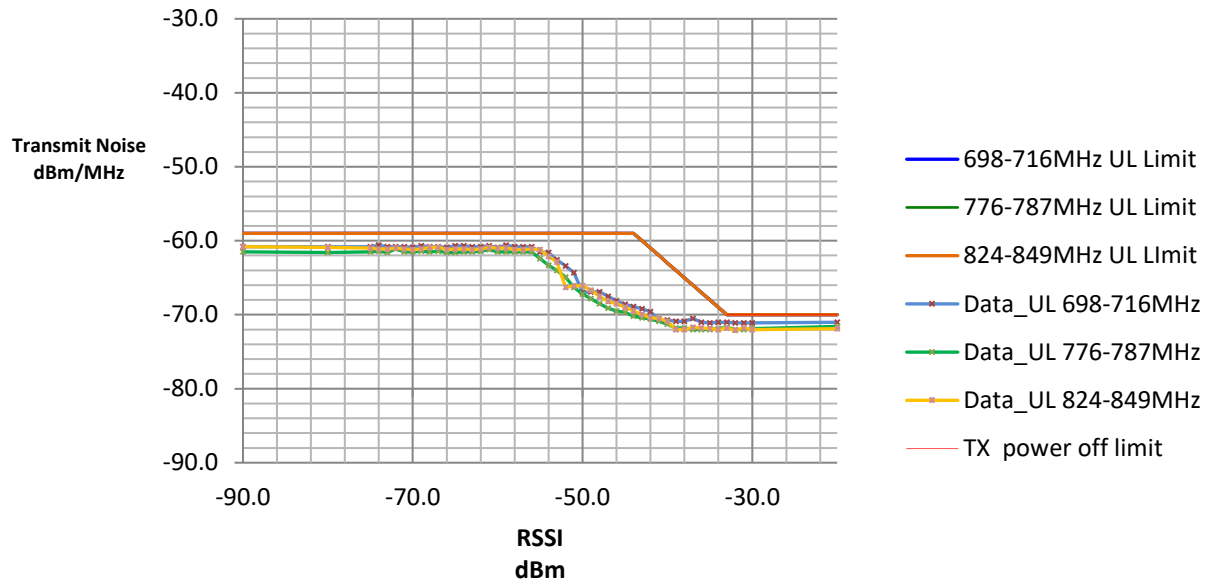
- 7.7.1 h-n: Maximum transmitter noise when varying the DL signal generator output level with a 4.1MHz AWGN signal



| 1710.0 - 1755.0 MHz |                          |                |                      |        |        |
|---------------------|--------------------------|----------------|----------------------|--------|--------|
| Limit               |                          |                |                      |        | Margin |
| RSSI (dBm)          | Measured Noise (dBm/MHz) | RSSI Dependent | Mobile Booster Limit | TX off |        |
| -75.0               | -60.7                    | -              | -59.0                | -      | -1.7   |
| -71.0               | -60.6                    | -              | -59.0                | -      | -1.6   |
| -34.0               | -76.3                    | -69.0          | -                    | -      | -7.3   |
| -33.0               | -76.8                    | -70.0          | -                    | -      | -6.8   |
| -32.0               | -77.2                    | -              | -                    | -70    | -7.2   |
| -31.0               | -77.6                    | -              | -                    | -70    | -7.6   |

| 1850.0 - 1915.0 MHz |                          |                |                      |        |        |
|---------------------|--------------------------|----------------|----------------------|--------|--------|
| Limit               |                          |                |                      |        | Margin |
| RSSI (dBm)          | Measured Noise (dBm/MHz) | RSSI Dependent | Mobile Booster Limit | TX off |        |
| -90.0               | -61.0                    | -              | -59.0                | -      | -2.0   |
| -80.0               | -60.9                    | -              | -59.0                | -      | -1.9   |
| -34.0               | -71.4                    | -69.0          | -59.0                | -      | -2.4   |
| -33.0               | -71.5                    | -70.0          | -59.0                | -      | -1.5   |
| -32.0               | -71.8                    | -              | -                    | -70    | -1.8   |
| -31.0               | -71.9                    | -              | -                    | -70    | -1.9   |

## 7.7 Booster UL Noise Limit



| 824.0 - 849.0 MHz |                          |                |                      |        |        |
|-------------------|--------------------------|----------------|----------------------|--------|--------|
| Limit             |                          |                |                      |        | Margin |
| RSSI (dBm)        | Measured Noise (dBm/MHz) | RSSI Dependent | Mobile Booster Limit | TX off |        |
| -90.0             | -60.8                    | -              | -59.0                | -      | -1.8   |
| -80.0             | -60.9                    | -              | -59.0                | -      | -1.9   |
| -34.0             | -72.0                    | -69.0          | -                    | -      | -3.0   |
| -33.0             | -71.8                    | -70.0          | -                    | -      | -1.8   |
| -31.0             | -71.8                    | -              | -                    | -70    | -1.8   |
| -20.0             | -71.9                    | -              | -                    | -70    | -1.9   |

| 698.0 - 716.0 MHz |                          |                |                      |        |        |
|-------------------|--------------------------|----------------|----------------------|--------|--------|
| RSSI (dBm)        | Measured Noise (dBm/MHz) | Limit          |                      |        | Margin |
|                   |                          | RSSI Dependent | Mobile Booster Limit | TX off |        |
| -74.0             | -60.6                    | -              | -59.0                | -      | -1.6   |
| -59.0             | -60.6                    | -              | -59.0                | -      | -1.6   |
| -34.0             | -71.0                    | -69.0          | -                    | -      | -2.0   |
| -33.0             | -71.0                    | -70.0          | -                    | -      | -1.0   |
| -32.0             | -71.1                    | -              | -                    | -70    | -1.1   |
| -31.0             | -71.1                    | -              | -                    | -70    | -1.1   |

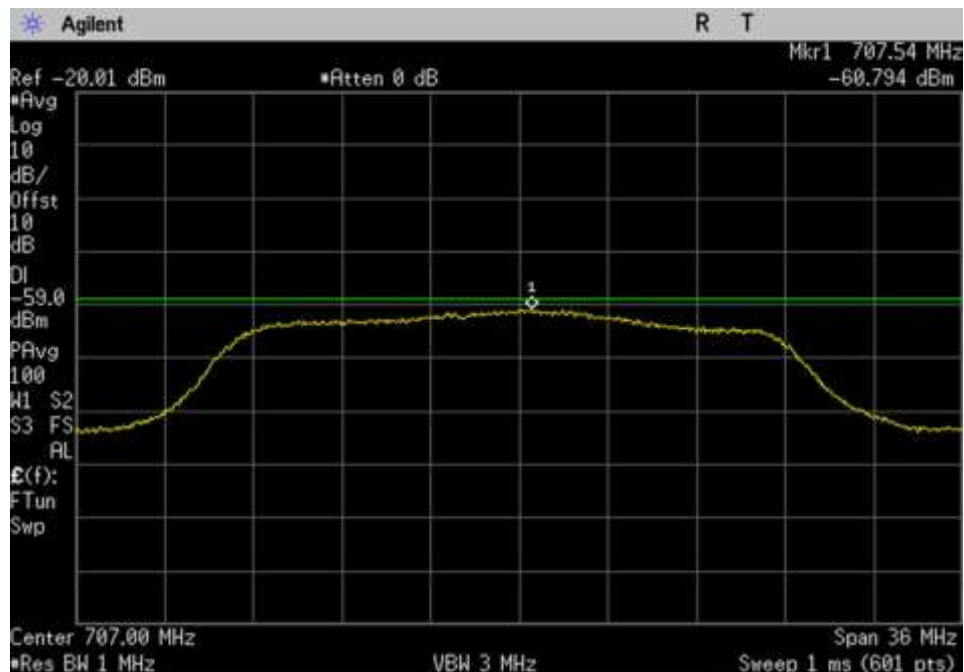
| 776.0 - 787.0 MHz |                          |                |                      |        |        |
|-------------------|--------------------------|----------------|----------------------|--------|--------|
| RSSI (dBm)        | Measured Noise (dBm/MHz) | Limit          |                      |        | Margin |
|                   |                          | RSSI Dependent | Mobile Booster Limit | TX off |        |
| -74.0             | -61.4                    | -              | -59.0                | -      | -2.4   |
| -72.0             | -61.1                    | -              | -59.0                | -      | -2.1   |
| -34.0             | -71.9                    | -69.0          | -                    | -      | -2.9   |
| -33.0             | -71.7                    | -70.0          | -                    | -      | -1.7   |
| -30.0             | -71.9                    | -              | -                    | -70    | -1.9   |
| -20.0             | -71.6                    | -              | -                    | -70    | -1.6   |

#### 7.7.2 Variable uplink noise timing

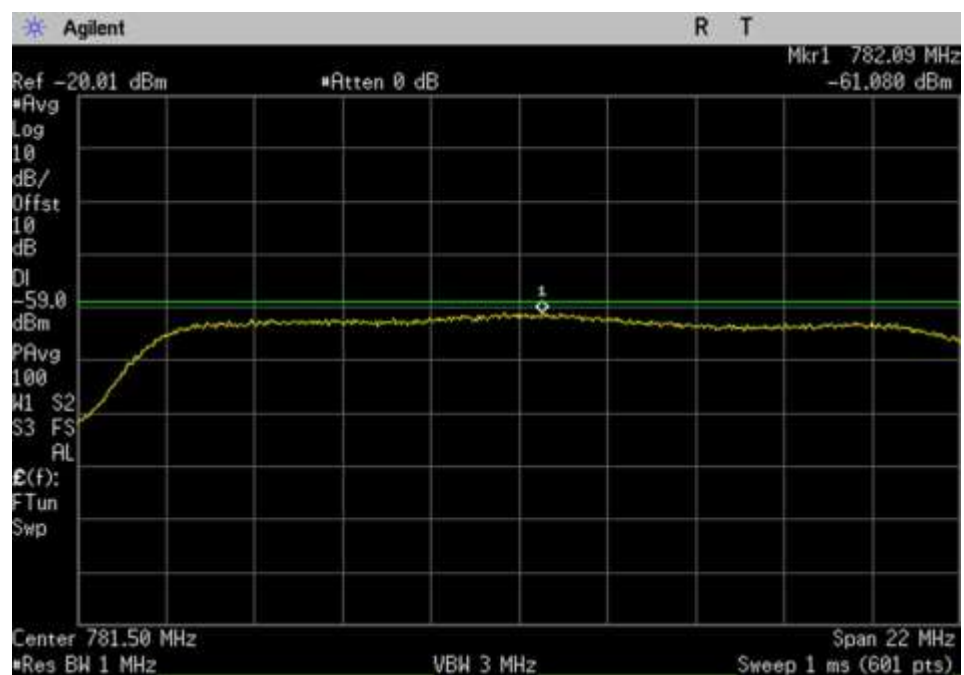
| Uplink Noise timing |              |           |
|---------------------|--------------|-----------|
| Frequency MHz       | Measured Sec | Limit sec |
| UL1710-1755         | 0.85         | 1.00      |
| UL1850-1915         | 0.75         | 1.00      |
| UL824-849           | 0.75         | 1.00      |
| UL 698-716          | 0.85         | 1.00      |
| UL776-787           | 0.87         | 1.00      |

## 7.7.1 Maximum Transmitter Noise Power Level

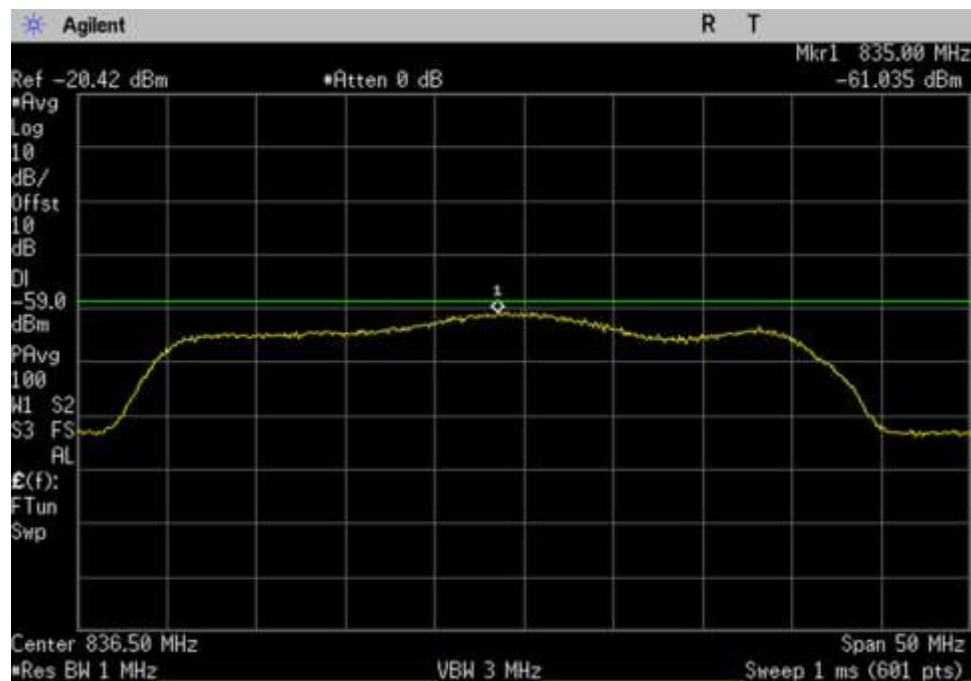
### Plots



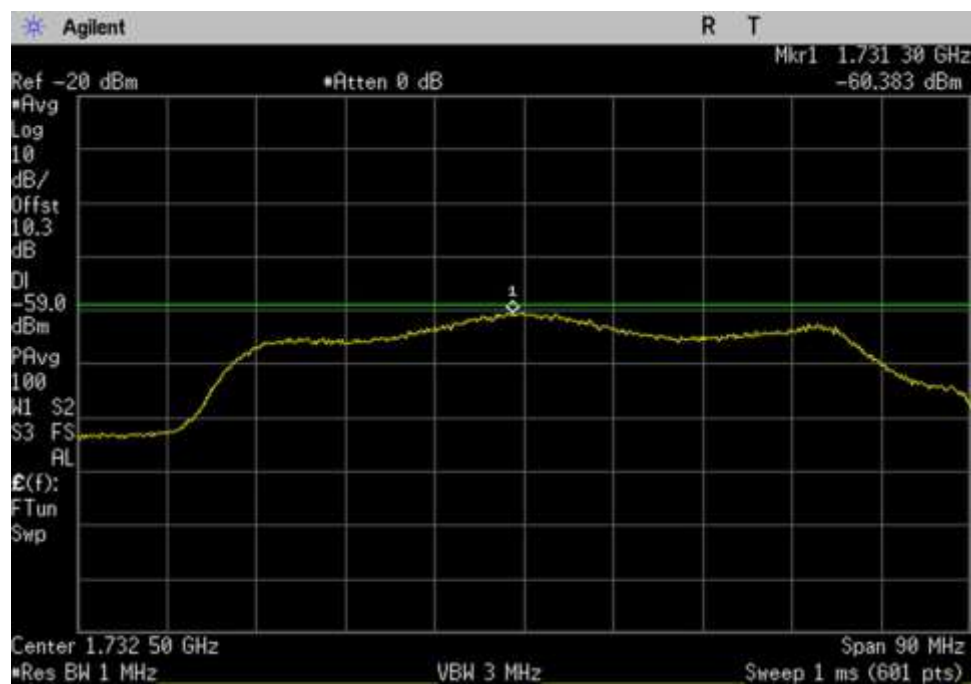
UL\_698-716\_707MHz



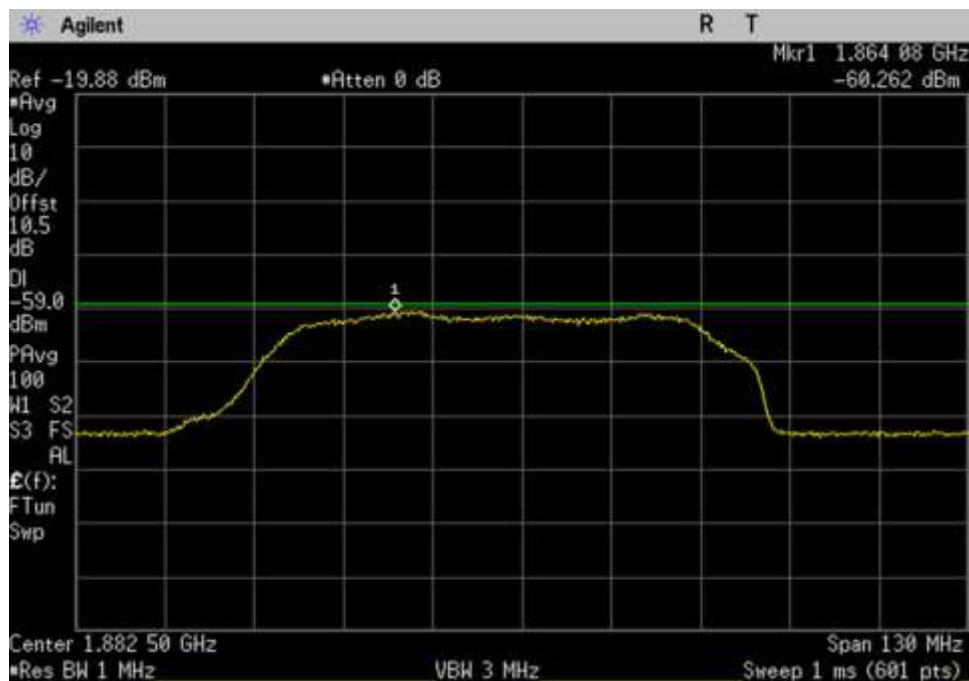
UL\_776-787\_781.5MHz



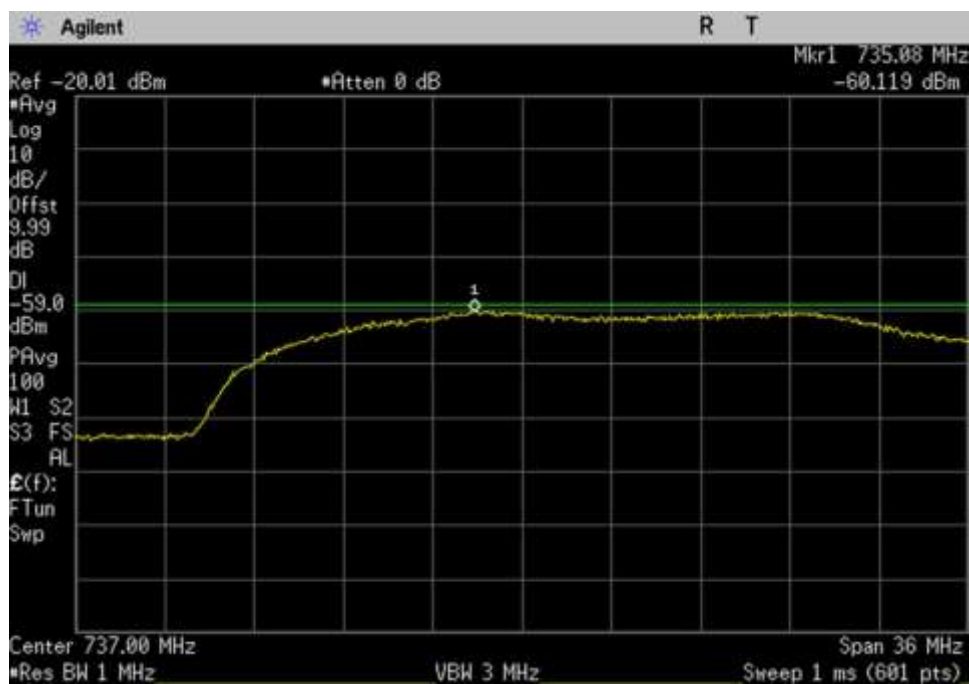
UL\_824-849\_ 836.5MHz



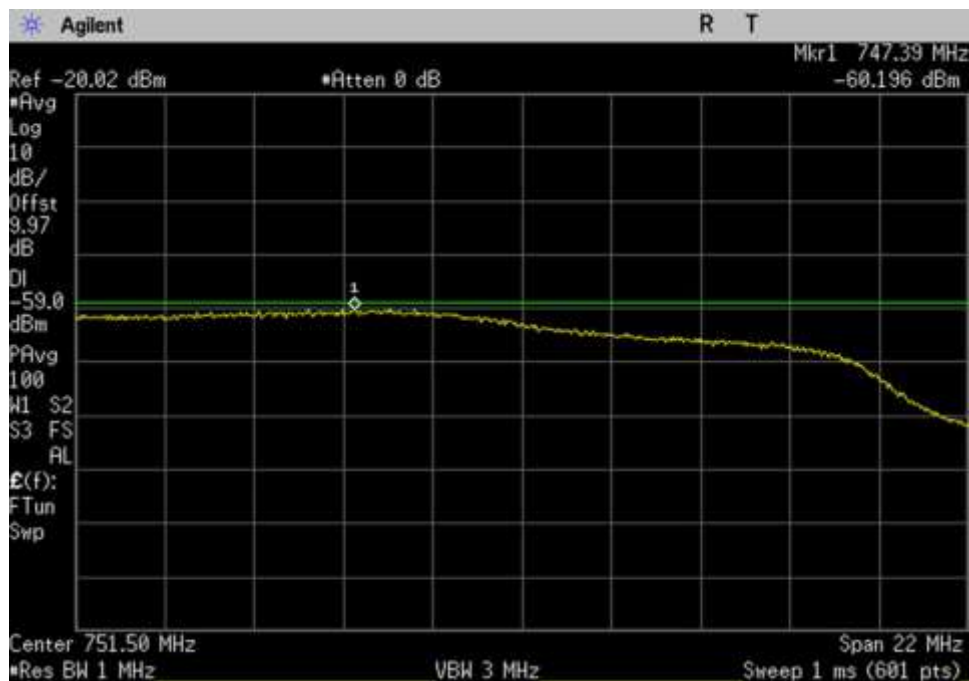
UL\_1710-1755\_ 1732.5MHz



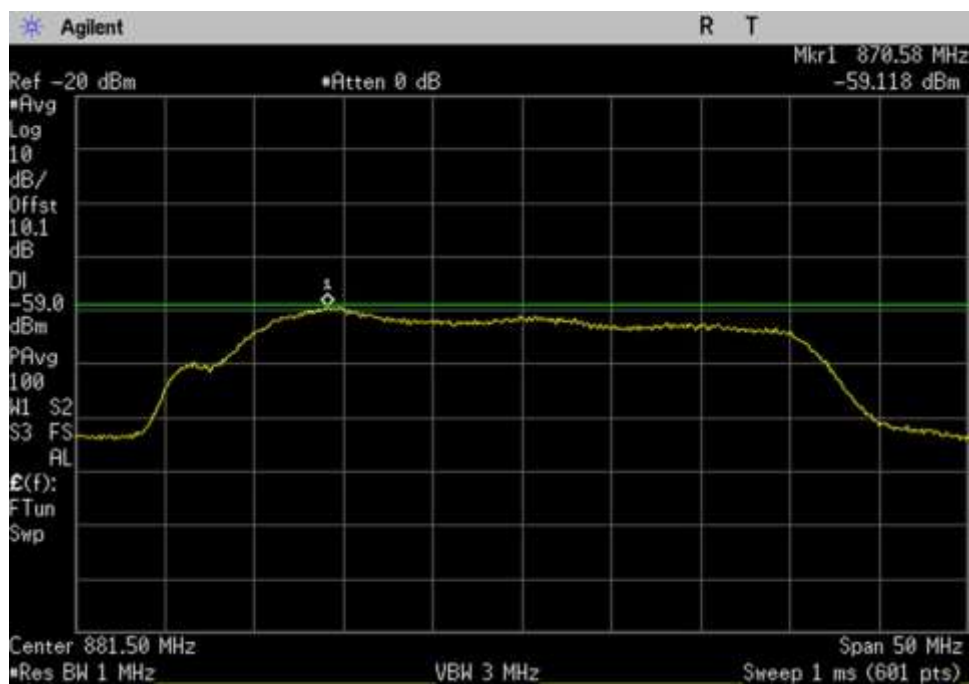
UL\_1850-1915\_ 1882.5MHz



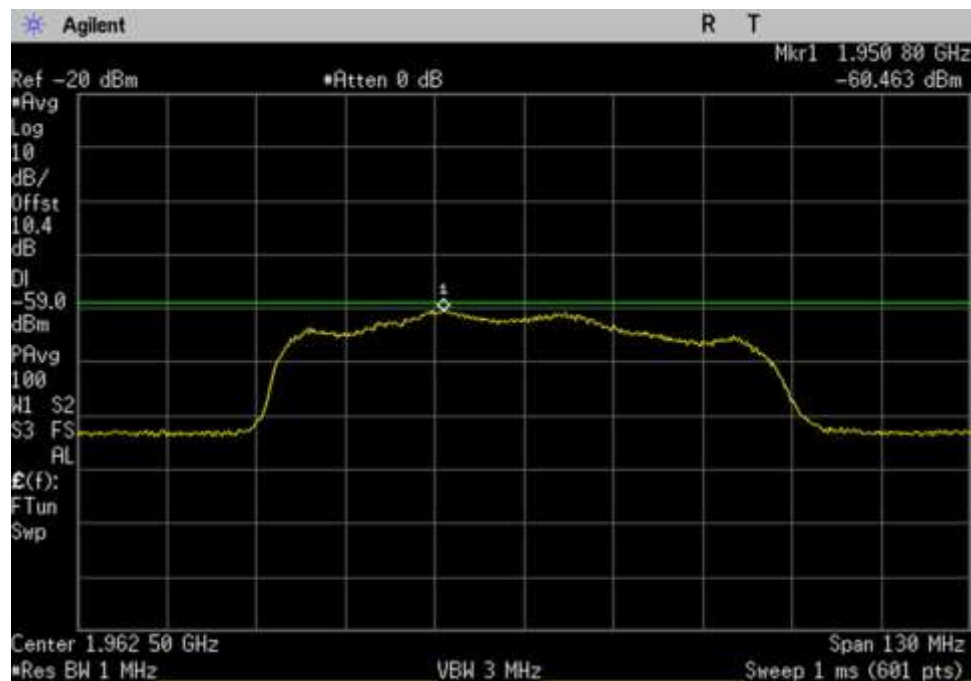
DL\_728-746\_ 737MHz



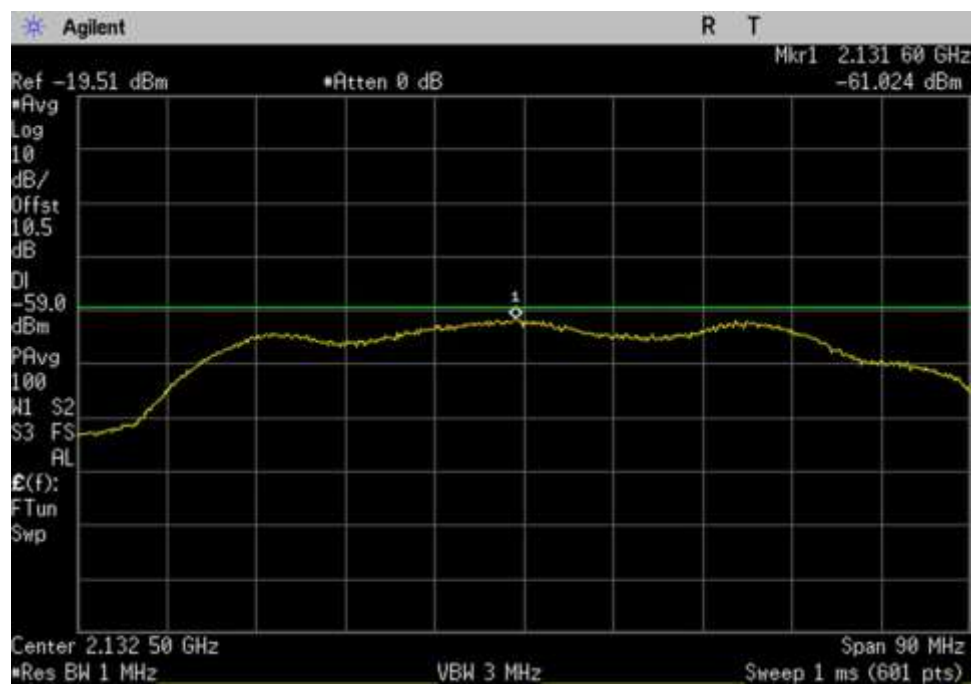
DL\_746-757\_ 751.5MHz



DL\_869-894\_ 881.5MHz



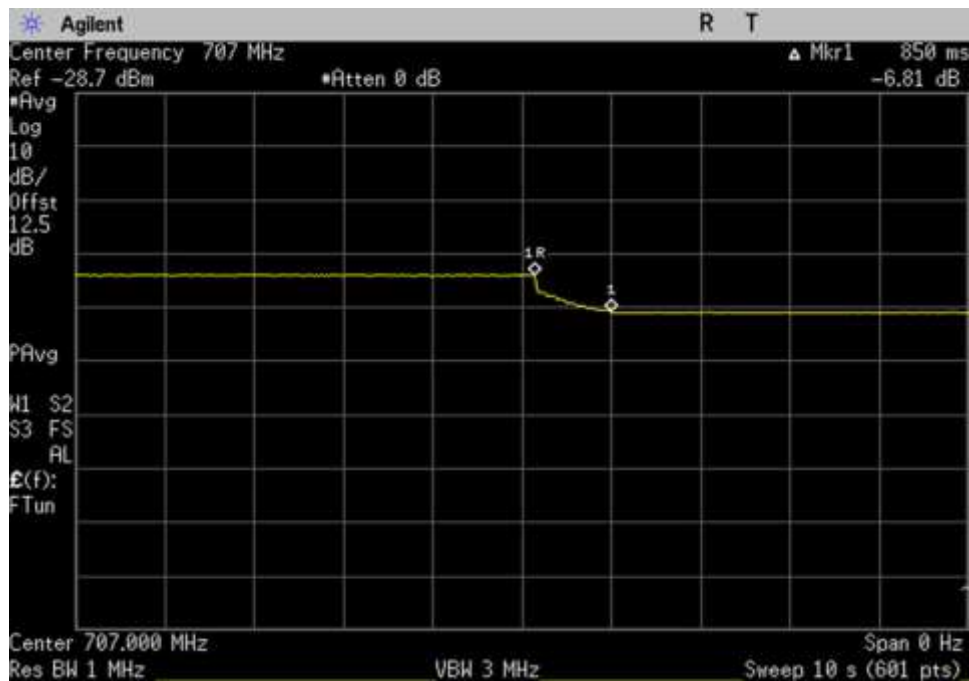
DL\_1930-1995\_ 1962.5MHz



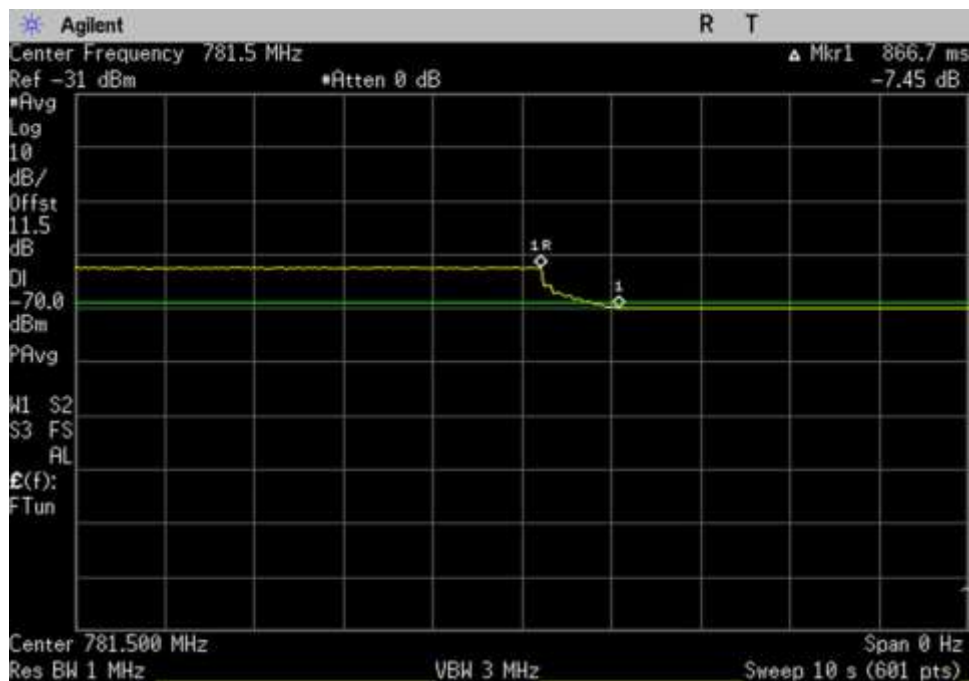
DL\_2110-2155\_ 2132.5MHz

## 7.7.2 Variable UL Noise Timing

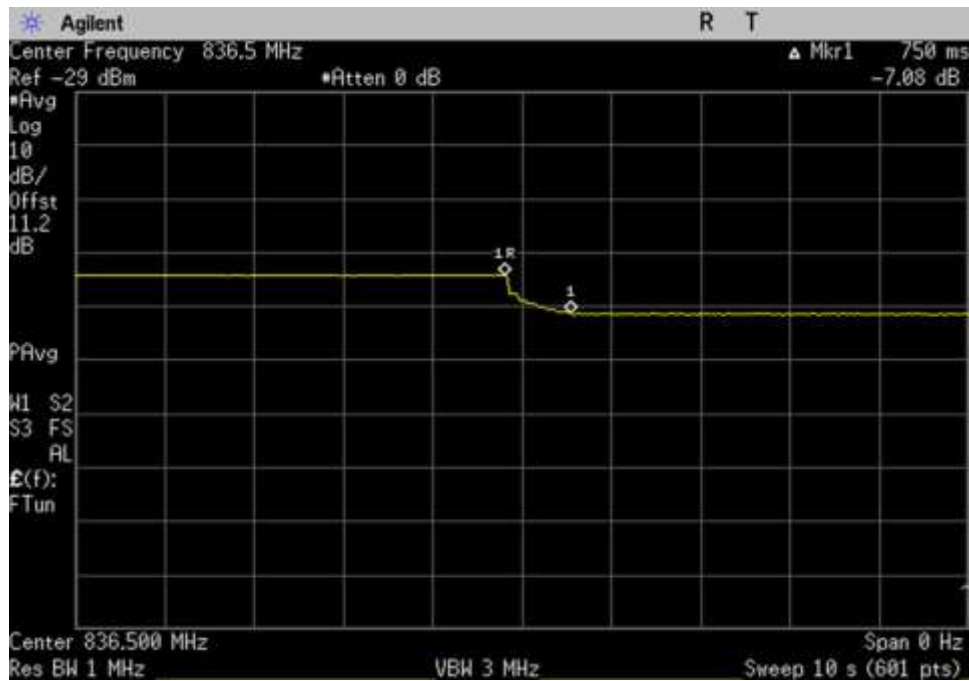
### Plots



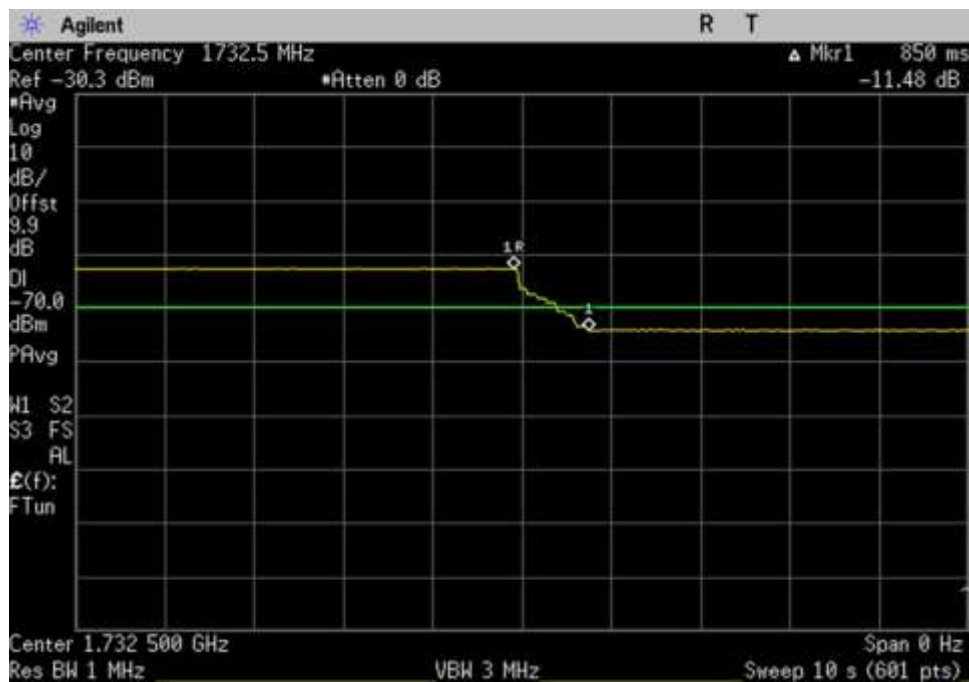
UL\_698-716\_707MHz\_Var



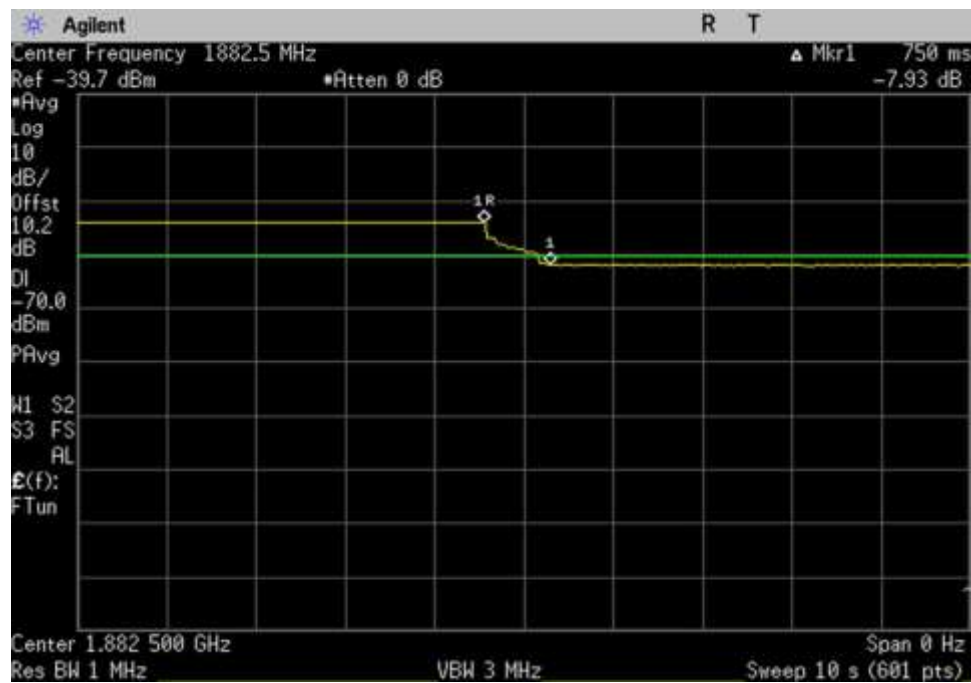
UL\_776-787\_781.5MHz\_Var



UL\_824-849\_ 836.5MHz\_Var



UL\_1710-1755\_ 1732.5MHz\_Var



UL\_1850-1915\_ 1882.5MHz\_Var

## 7.8 Uplink Inactivity

### Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170  
 Customer: Cellphone-Mate, Inc.  
 Specification: **7.8 Uplink Inactivity**  
 Work Order #: **101623** Date: 08/22/18  
 Test Type: **Conducted Emissions**  
 Tested By: **Hieu Song Nguyenpham**  
 Software: EMITest 5.03.11

#### Equipment Tested:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

#### Support Equipment:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

#### Test Conditions / Notes:

Test environment conditions:  
 Temperature: 21.6 °C  
 Relative Humidity: 47%  
 Pressure: 101.5kPa

#### Test Equipment:

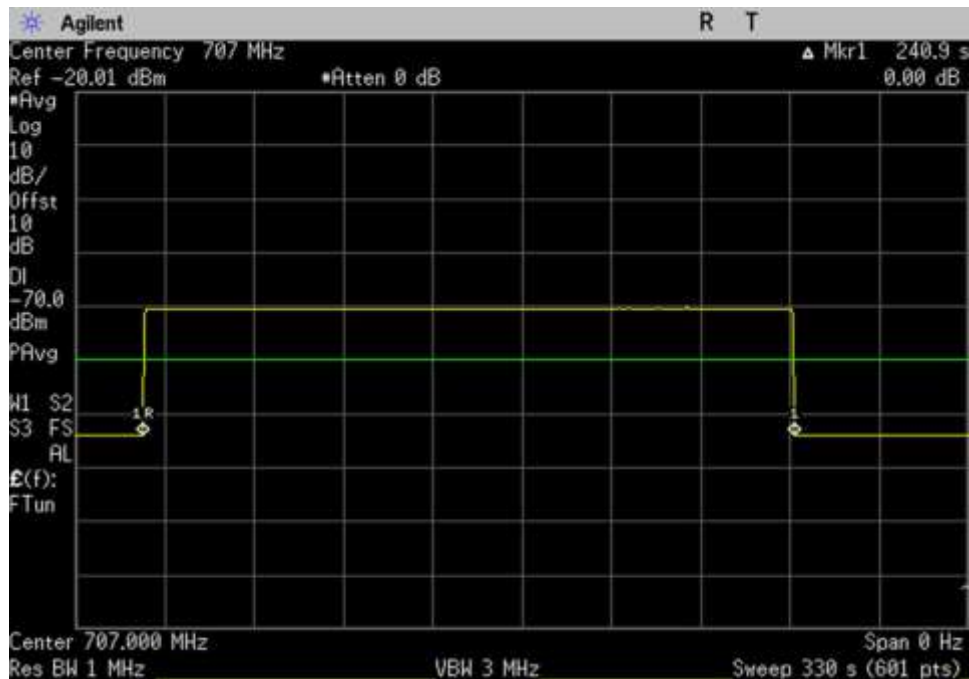
| Asset # | Description       | Manufacturer | Model                    | Calibration Date | Cal Due Date |
|---------|-------------------|--------------|--------------------------|------------------|--------------|
| P07192  | Cable             | Astro        | 32022-29094K-29094K-48TC | 10/9/2017        | 10/9/2019    |
| P07191  | Cable             | Astro        | 32022-29094K-29094K-48TC | 10/30/2017       | 10/30/2019   |
| 03418   | Signal Generator  | Agilent      | E4438C                   | 6/19/2017        | 6/19/2019    |
| 03470   | Spectrum Analyzer | Agilent      | E4440A                   | 1/3/2018         | 1/3/2020     |
| P05411  | Attenuator        | Weinschel    | 54A-10                   | 1/19/2018        | 1/19/2020    |

## Summary of Results

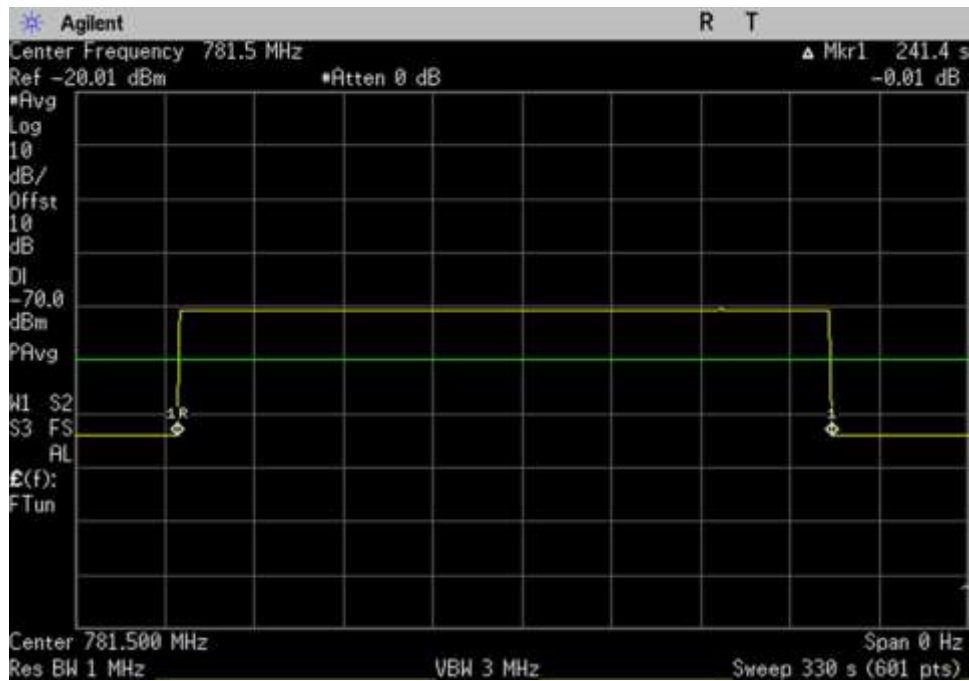
Pass: As demonstrated, when the booster is not serving an active device connection after 5 minutes the uplink noise power does not exceed -70dBm/MHz.

| Uplink Inactivity |                 |              |
|-------------------|-----------------|--------------|
| Frequency<br>MHz  | Measured<br>Min | Limit<br>Min |
| UL1710-1755       | 4.0             | 5.0          |
| UL1850-1915       | 4.0             | 5.0          |
| UL824-849         | 4.0             | 5.0          |
| UL 698-716        | 4.0             | 5.0          |
| UL776-787         | 4.0             | 5.0          |

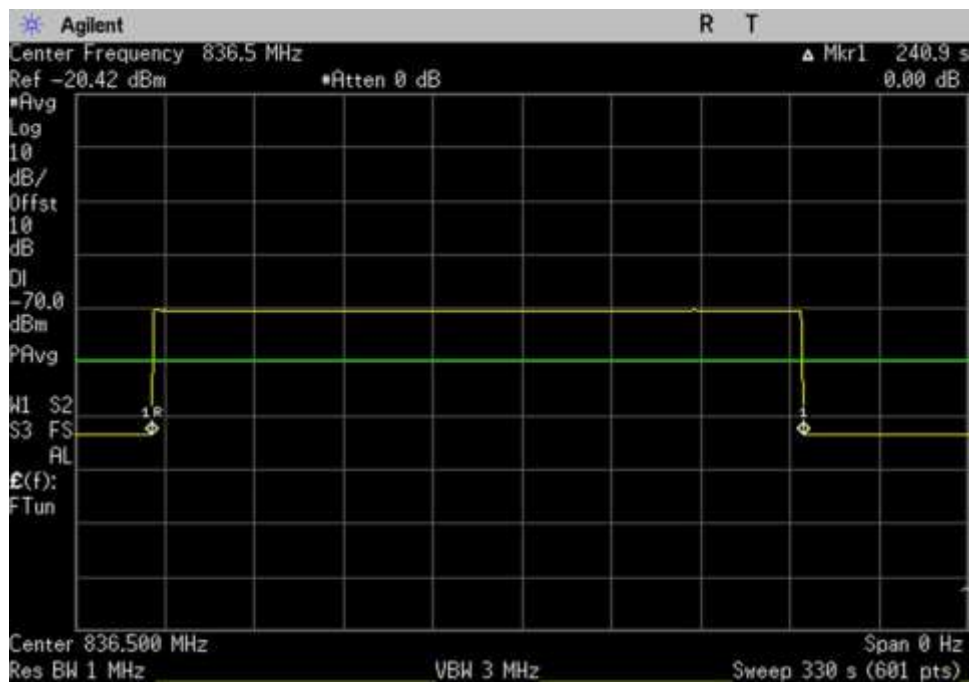
## Plots



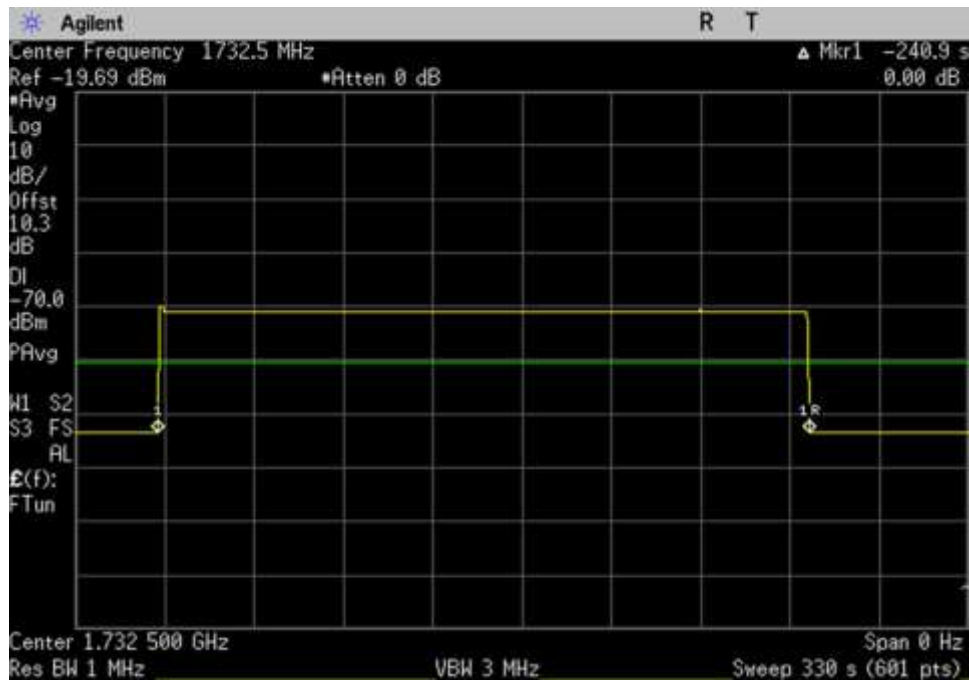
UL\_698-716\_707MHz



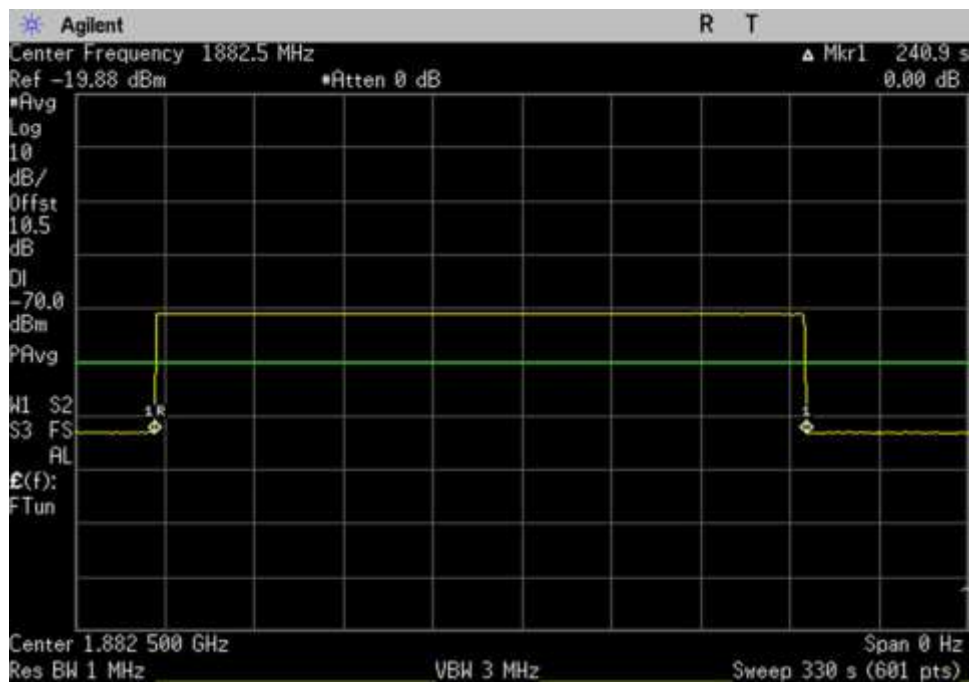
UL\_776-787\_ 781.5MHz



UL\_824-849\_ 836.5MHz



UL\_1710-1755\_1732.5MHz



UL\_1850-1915\_1882.5MHz

## 7.9 Booster Gain Limit

### Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170  
 Customer: Cellphone-Mate, Inc.  
 Specification: **7.9 Variable Booster gain( Max Gain / Variable Uplink Gain Timing)**  
 Work Order #: **101623**  
 Test Type: **Conducted Emissions** Date 08/23/18  
 Tested By: **Hieu Song Nguyenpham**  
 Software: EMITest 5.03.11

#### Equipment Tested:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

#### Support Equipment:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

#### Test Conditions / Notes:

Test environment conditions:  
 Temperature: 21.9°C  
 Relative Humidity: 46.9%  
 Pressure: 100.8kPa

| Frequency (MHz)   | MSCL (dB) |
|-------------------|-----------|
| PCS(1850-1915)    | 37.8      |
| Cellular(824-849) | 32.5      |
| LTE(698-716)      | 30.6      |
| LTE(776-787)      | 31.5      |
| AWS(1710-1755)    | 37        |

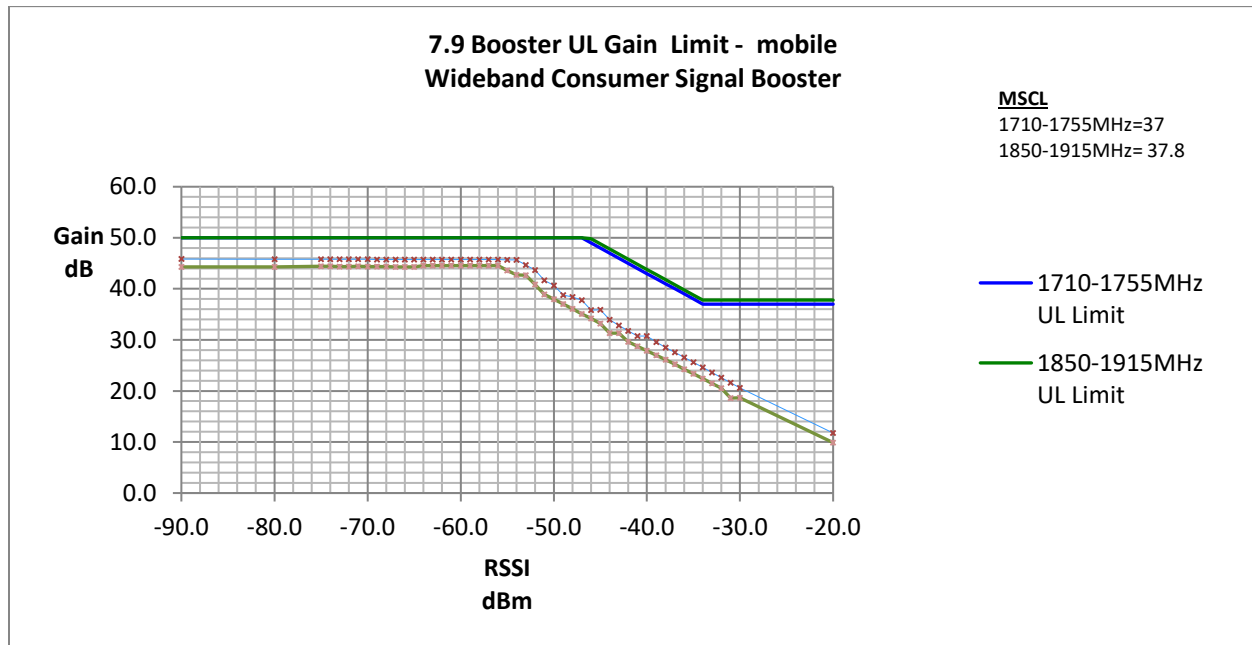
#### Test Equipment:

| Asset # | Description                  | Manufacturer           | Model                    | Calibration Date | Cal Due Date |
|---------|------------------------------|------------------------|--------------------------|------------------|--------------|
| P07192  | Cable                        | Astro                  | 32022-29094K-29094K-48TC | 10/9/2017        | 10/9/2019    |
| P07191  | Cable                        | Astro                  | 32022-29094K-29094K-48TC | 10/30/2017       | 10/30/2019   |
| 03418   | Signal Generator             | Agilent                | E4438C                   | 6/19/2017        | 6/19/2019    |
| 03470   | Spectrum Analyzer            | Agilent                | E4440A                   | 1/3/2018         | 1/3/2020     |
| P06904  | Cable                        | Astrolab               | 32022-29094K-29094K-36TC | 1/4/2018         | 1/4/2020     |
| C00082  | Directional Coupler          | MECA Electronics, Inc. | 722-10-1.500V            | 9/18/2017        | 9/18/2019    |
| C00032  | Arbitrary Waveform Generator | Agilent                | E4433B                   | 3/19/2018        | 3/19/2020    |

## Summary of Results

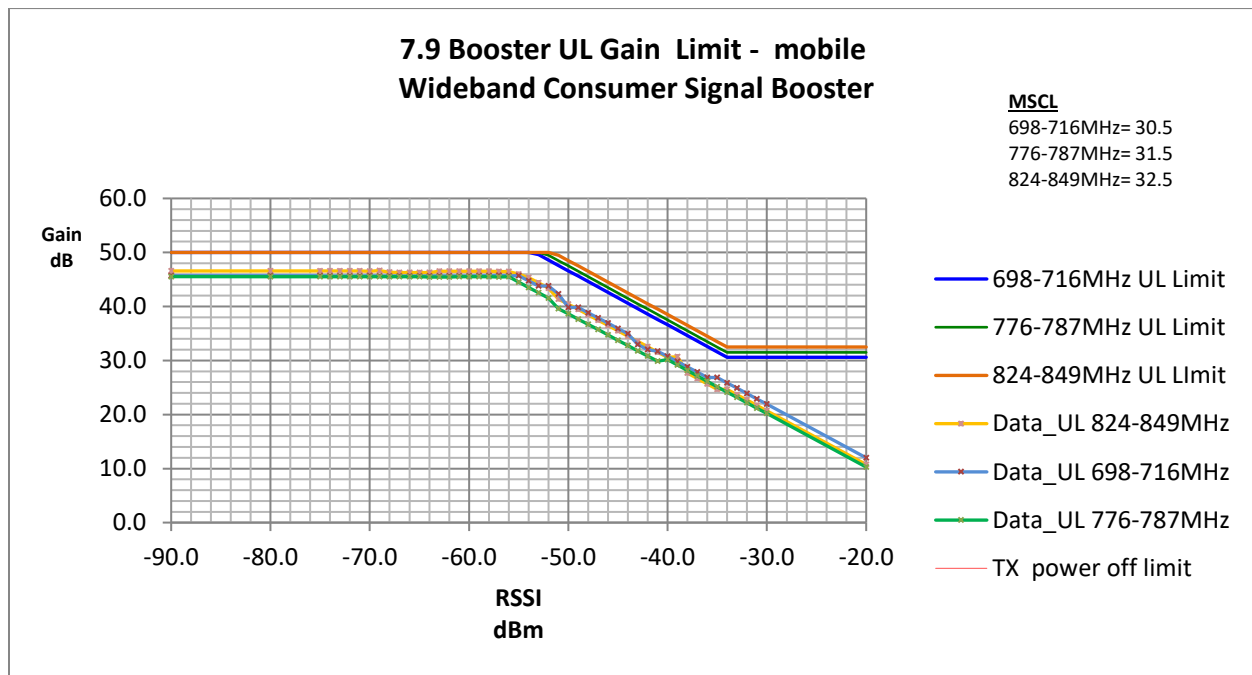
**Pass:** As demonstrated, computed gains are within the gain limit. All maximum variable uplink gain timings are within 1 second limit.

### 7.9.1 Maximum gain



| 1710.0 - 1755.0 MHz |                |                             |                        |                   |                            |        |        |
|---------------------|----------------|-----------------------------|------------------------|-------------------|----------------------------|--------|--------|
| RSSI<br>(dBm)       | Input<br>(dBm) | Measured<br>Output<br>(dBm) | Measured<br>Gain (dBm) | Limit             |                            |        | Margin |
|                     |                |                             |                        | RSSI<br>Dependent | Mobile<br>Booster<br>Limit | TX off |        |
| -90.0               | -29            | 16.83                       | 45.8                   | -                 | 50.0                       | -      | -4.2   |
| -80.0               | -29            | 16.814                      | 45.8                   | -                 | 50.0                       | -      | -4.2   |
| -45.0               | -29            | 6.9                         | 35.9                   | 48.0              | -                          | -      | -12.1  |
| -40.0               | -29            | 1.8                         | 30.8                   | 43.0              | -                          | -      | -12.2  |
| -34.0               | -29            | -4.4                        | 24.6                   | -                 | -                          | 37     | -12.4  |
| -33.0               | -29            | -5.4                        | 23.6                   | -                 | -                          | 37     | -13.4  |

| 1850.0 - 1915.0 MHz |             |                       |                     |                |                      |        |        |
|---------------------|-------------|-----------------------|---------------------|----------------|----------------------|--------|--------|
| RSSI (dBm)          | Input (dBm) | Measured Output (dBm) | Measured Gain (dBm) | Limit          |                      |        | Margin |
|                     |             |                       |                     | RSSI Dependent | Mobile Booster Limit | TX off |        |
| -75.0               | -30.0       | 14.4                  | 44.4                | -              | 50.0                 | -      | -5.6   |
| -74.0               | -30.0       | 14.4                  | 44.4                | -              | 50.0                 | -      | -5.6   |
| -36.0               | -30.0       | -5.7                  | 24.3                | 39.8           | -                    | -      | -15.5  |
| -35.0               | -30.0       | -6.7                  | 23.3                | 38.8           | -                    | -      | -15.5  |
| -34.0               | -30.0       | -7.6                  | 22.4                | -              | -                    | 37.8   | -15.4  |
| -33.0               | -30.0       | -8.5                  | 21.5                | -              | -                    | 37.8   | -16.3  |



| 824.0 - 849.0 MHz |             |                       |                     |                |                      |        |        |
|-------------------|-------------|-----------------------|---------------------|----------------|----------------------|--------|--------|
| RSSI (dBm)        | Input (dBm) | Measured Output (dBm) | Measured Gain (dBm) | Limit          |                      |        | Margin |
|                   |             |                       |                     | RSSI Dependent | Mobile Booster Limit | TX off |        |
| -90.0             | -26.5       | 20.1                  | 46.6                | -              | 50.0                 | -      | -3.4   |
| -80.0             | -26.5       | 20.1                  | 46.6                | -              | 50.0                 | -      | -3.4   |
| -50.0             | -26.5       | 13.9                  | 40.4                | 48.5           | -                    | -      | -8.1   |
| -49.0             | -26.5       | 12.9                  | 39.4                | 47.5           | -                    | -      | -8.1   |
| -34.0             | -26.5       | -1.8                  | 24.7                | -              | -                    | 32.5   | -7.8   |
| -33.0             | -26.5       | -2.8                  | 23.7                | -              | -                    | 32.5   | -8.8   |

| 698.0 - 716.0MHz |             |                       |                     |                |                      |        |        |
|------------------|-------------|-----------------------|---------------------|----------------|----------------------|--------|--------|
| RSSI (dBm)       | Input (dBm) | Measured Output (dBm) | Measured Gain (dBm) | Limit          |                      |        | Margin |
|                  |             |                       |                     | RSSI Dependent | Mobile Booster Limit | TX off |        |
| -90.0            | -24.5       | 21.2                  | 45.7                | -              | 50.0                 | -      | -4.3   |
| -80.0            | -24.5       | 21.2                  | 45.7                | -              | 50.0                 | -      | -4.3   |
| -36.0            | -24.5       | 2.4                   | 26.9                | 32.6           | -                    | -      | -5.7   |
| -35.0            | -24.5       | 2.4                   | 26.9                | 31.6           | -                    | -      | -4.7   |
| -34.0            | -24.5       | 1.4                   | 25.9                | -              | -                    | 30.6   | -4.7   |
| -33.0            | -24.5       | 0.4                   | 24.9                | -              | -                    | 30.6   | -5.7   |

| 776.0 - 787.0 MHz |             |                       |                     |                |                      |        |        |
|-------------------|-------------|-----------------------|---------------------|----------------|----------------------|--------|--------|
| RSSI (dBm)        | Input (dBm) | Measured Output (dBm) | Measured Gain (dBm) | Limit          |                      |        | Margin |
|                   |             |                       |                     | RSSI Dependent | Mobile Booster Limit | TX off |        |
| -90.0             | -25.0       | 20.5                  | 45.5                | -              | 50.0                 | -      | -4.5   |
| -80.0             | -25.0       | 20.5                  | 45.5                | -              | 50.0                 | -      | -4.5   |
| -36.0             | -25.0       | 1.2                   | 26.2                | 33.5           | -                    | -      | -7.3   |
| -35.0             | -25.0       | 0.2                   | 25.2                | 32.5           | -                    | -      | -7.3   |
| -34.0             | -25.0       | -0.9                  | 24.1                | -              | -                    | 31.5   | -7.4   |
| -33.0             | -25.0       | -1.8                  | 23.2                | -              | -                    | 31.5   | -8.3   |

## 7.9.2 Variable uplink gain timing

| Uplink Gain Timing |                |             |
|--------------------|----------------|-------------|
| Frequency (MHz)    | Measured (Sec) | Limit (Sec) |
| UL 1710-1755       | 0.63           | 1.00        |
| UL 1850-1915       | 0.88           | 1.00        |
| UL 824-849         | 0.75           | 1.00        |
| UL 698-716         | 0.78           | 1.00        |
| UL 776-787         | 0.72           | 1.00        |

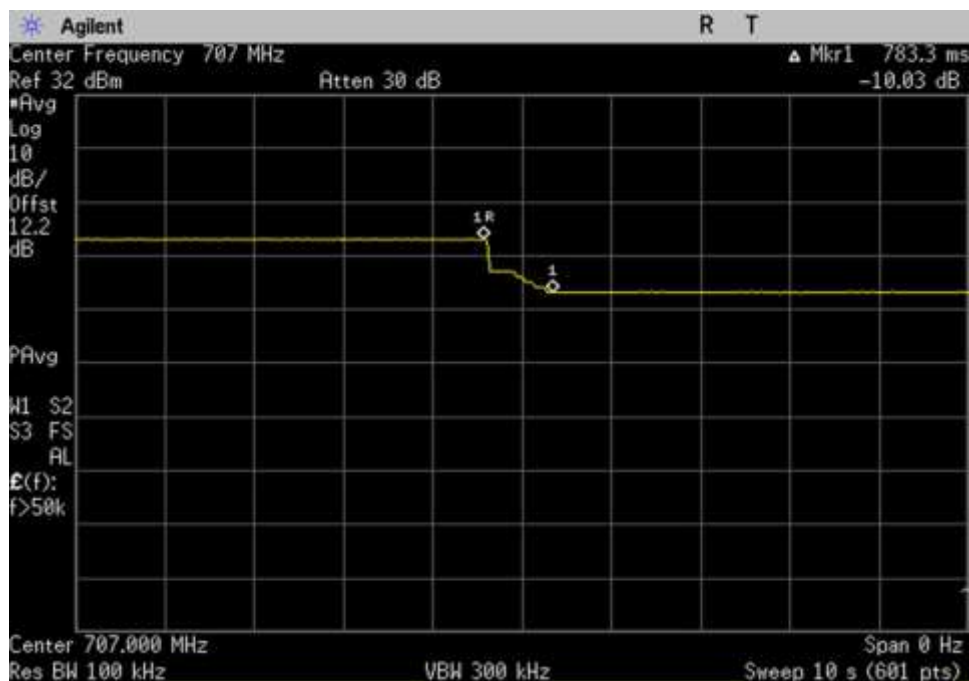
### 7.9.1 Maximum Gain

For this subsection, see summary of results of 7.9

7.9.1 Maximum gain

### 7.9.2 Variable uplink Gain Timing

## Plots



UL\_698-716\_ 707MHz